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PROJECT PR[illegible] SHIL 302 (1)
SHILOH NATIONAL MILITARY PARK
HARDIN COUNTY, TENNESSEE

FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
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Note: Design changes subsequent to publication of this report and prior to project advertisement will be documented by a memo inserted after the title page.

GEOTECHNICAL
REPORT NO. 24-99

PROJECT PRA SHIL 502 (1)
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INTRODUCTION

General

This report presents the results of the geotechnical investigation for Project SHIL 502 (1) located at Shiloh National Military Park in Harding County, Tennessee. The project involves rehabilitation and reconstruction of 14.7 km of the park roads, parking areas, turnarounds and replacement of a small bridge with a bottomless structural plate pipe-arch culvert. A Project Location Map and Project Vicinity Map are presented in Appendix A.

Project Description

Brown's Landing Road (NPS Route 502)

Brown's landing road will be widened to accommodate two-way traffic from Hamburg-Savannah road to the Indian Mound palisades near the vicinity of the 17th Kentucky Infantry Monument. A new parking area and turnaround will be reconstructed at the Indian Mound palisades.

Pittsburg Landing Road I (NPS Route 13)

Pittsburg Landing road I and turnouts will be overlaid with hot asphalt concrete pavement (HACP). The road will be relocated beginning east of Chambers Field and terminating near the front gate of the cemetery. Two concrete pads will be constructed for the vista off of Brown's Landing Road overlooking Pittsburg landing road.

The section of the maintenance service road extending between the existing and proposed Pittsburg Landing road I alignment at approximate station 21+360 will be reconstructed.

Visitor Center and Cemetery Parking Areas

The existing main visitor center and cemetery parking areas will be reconfigured and reconstructed.

Pittsburg Landing Road II

The retaining wall will be removed and a bus and 2-car turnaround will be constructed. The remaining portion of the road will be overlaid with HACP.

Reconnoitering Road (NPS Route 500)

Reconnoitering road will be overlaid with HACP. The existing bridge on Reconnoitering road is 4.0 m long and 5.5 m wide bridge span that will be replaced with a bottomless structural plate arch pipe 4.4 m long by 9.5 m wide in order to accommodate a travel lane and a pedestrian and bike sidewalk.

Corinth-Pittsburg Landing Road (NPS Route 12)

Corinth-Pittsburg is currently a reinforced portland cement concrete (RPCC) paved road. The RPCC pavement will be rehabilitated including cleaning and sealing of the transverse and longitudinal joints and repairing of the transverse cracks.

New Entrance Road

A new entrance road will be constructed from Pittsburg landing road I to Corinth-Pittsburg landing road on an existing surface treated road.

McClernand Road

A portion of McClernand road will be overlaid with HACP and a portion will be realigned.

Eastern Corinth road I (NPS Route 14)

Eastern Corinth road will be overlaid with HACP between station 10+000 and 11+115 during this phase of the project the remainder of this road will be rehabilitated under a future project. It's intersection with Peabody Road and Bark Road will be reconfigured.

Peabody Road (NPS Route 501)

Peabody road will be overlaid with HACP. The gravel tour stop area located left of station 11+000 will be reconstructed.

Hamburg-Savannah Road (NPS Route 11)

Hamburg-Savannah road will be overlaid with HACP. The two-car turnout right of station 11+330 ± will be paved. Rehabilitation of the following parking areas and roadway located off of Hamburg-Savannah road will be performed.

New One-way Loop Around Tent Hospital Site

A new one-way loop will be constructed from station 10+050 to a dirt road along the northeast park's boundary then back to the Tent Hospital site access road.

Johnston Memorial

Johnston memorial will be overlaid with HACP. A two-bus turnout will be constructed to the northeast of the existing loop.

Peach Orchard Parking Area

The northern end of the parking will be widened to improve accessibility for the buses.

Bloody Pond Tour Stop

The roadway and the two turnouts at Bloody Pond tour stop will be reconstructed.

Regional Geology

The project site is located within the Gulf Coastal Plain physiographic province. The majority of the project site is underlain by high-level alluvial deposits which consist of iron stained gravel, sand, silt and clay; variable in thickness but generally less than 18 m thick. Alluvial deposits and the Coffee Sand formations underlie the site in the flood plain areas parallel to the Tennessee River. The alluvial deposits consist of sand, silt, clay and gravel and range in thickness between 6 m to more than 30 m. The Coffee Sand formation consists of loose fine-grained sand, light-gray, glauconitic, micaceous; interbedded with laminated lignitic clay. The thickness of the Coffee Sand formation varies between 7 and 61 m.

The majority of the near-surface soils at the site are of the Paden-Pickwick-Waynesboro association. This association consists of moderately well drained soils and well drained soils on high terraces. Paden and Pickwcik soil series make up about 70 percent of the association. The surface layer is loam and silt loam. The subsoil is chiefly silty clay loam and clay loam. The Waynesboro series consists of fine sandy loam and gravelly sandy loam. The near-surface soils adjacent to the Tennessee River are of the Wolftever-Beason-Egam association. This association consists of nearly level soils on low stream terraces and flood plains of the Tennessee River. The surface layer consists of dark grayish-brown to brown silt loam and varies in depth between 0.45 and 0.8 m. The substratum is brown or yellowish-brown silt loam with varying amounts of chert.

PROCEDURES AND RESULTS

The field investigation for this project consisted of a generalized pavement condition survey and a subsurface exploration program. General procedures used during performance of the field investigations are expounded as follows:

Pavement Condition Survey

Pavement condition surveys were conducted by Eastern Federal Lands Highway Division (EFLHD) geotechnical personnel during August, 1996 and August 1999. The pavement condition surveys were conducted in general accordance with the "Distress Identification Manual for the Long-Term Pavement Performance Project (SHRP-P-338)". The purpose of the pavement condition surveys was to make a preliminary determination of the types and limits of the different reconstruction or rehabilitation techniques that would be required based on the type, severity and extent of pavement distress.

Soil Borings

The subsurface exploration program was conducted by EFLHD geotechnical personnel during August 1996, consisting of sixty six borings. Borings were drilled using a trailer-mounted CME 45 drill rig. Approximate locations of each boring are shown on the Boring Location Plans in Appendix B. Borings were advanced using hollow-stem augers to depths ranging from 1.35 to 4.98 meters. Pavement cores were obtained at 11 locations.

Sampling

Sampling of materials beneath the tip of the hollow-stem augers was performed in each boring through the auger stem as the borings were advanced. Representative soil samples were retrieved using 50 mm outside diameter split-barrel sampler in accordance with AASHTO T200-87. Sampling was typically conducted continuously to the termination depth of all borings . Representative portions of split-spoon samples were preserved in glass jars for laboratory testing. Additionally, five bulk samples of auger cuttings were collected from Borings VC-6, R-2, RS-3, T-4 and BL-3. The sampling sequence and associated jar and bag samples for each boring are presented on its appropriate Boring Log in Appendix C.

Field Tests and Measurements

The following field tests and measurements were performed by exploration personnel during the course of the subsurface exploration. Boring locations were determined from features present on site. Standard penetration tests (SPT) were performed and resistance was recorded during the recovery of each split barrel sample, in accordance with AASHTO T206-87. The sampler was driven into the soil using an automatic hammer. Sample recovery measurements were made and recorded for each sampling attempt. Asphalt and base thickness were measured for each pavement encountered. The relative consistency of each cohesive soil sample was estimated using a calibrated pocket penetrometer. A field description by color and texture was made for each recovered soil sample. The depth of groundwater, if present, was measured at the time of completion of each boring, and again prior to backfilling the boreholes.

Data Summary

The results of the field tests and measurements were recorded on the drillers logs and appropriate

data sheets in the field. These data sheets and logs contain information concerning the boring methods; samples attempted and recovered; indications of the presence of various materials such as gravel, pebbles, organic matter, etc. They also contain interpretations by the exploration foreman of the conditions between samples based on the performance of the equipment and cuttings brought to the surface by the drilling tools. Therefore, the field data represents both factual and interpretative information.

The Boring Logs in Appendix C of this report represent a compilation of field and laboratory data and descriptions of the soil and rock samples by a geotechnical engineer. Occasionally, these records do not include all data recorded on driller's logs and field data sheets, but do include all information considered relevant to the design and construction of this project.

Laboratory Investigation

At the conclusion of the field work, laboratory testing was conducted on select representative soil samples. Laboratory tests included gradation (AASHTO T-27), Atterberg limits (AASHTO T-89, T-90), classification (AASHTO T-317) and moisture content (AASHTO T-265). Five bulk samples from Borings VC-6, R-2, RS-3, T-4 and BL-3 were tested for the California Bearing Ratio (AASHTO T-193) and Standard Proctor tests (AASHTO T-99), including maximum dry density and optimum moisture content. The results of the laboratory tests on the jar and bulk samples are presented in Appendix D. The results of the laboratory tests on the bulk samples are summarized in Table 1.

TABLE 1 - BULK SAMPLES LABORATORY TEST DATA

Boring No.	AASHTO Classification	Liquid Limit	Plasticity Index	Percent Fines	Optimum Moisture Content %	Maximum Dry Density (kN/m³)	CBR
BL-3	A-4	25	6	57	10.7	19.1	11
PLI-3	A-6	35	18	83	14.0	18.4	7
VC-6	A-7-6	48	29	77-	16.3	17.9	6
R-2	A-7-6	50	26	44	13.8	18.5	8
RS-3	A-6	29	11	--	15.8	18.1	8
T-4	A-7-6	31	13	74	11.3	19.46	7

Findings

Findings for each site are described below. A summary of the pavement borings is listed in Tables D-1 through D-5 in Appendix D. Included in those tables are the existing AC, RPCC (where present) and aggregate base thicknesses and subgrade material classification encountered at each boring.

Brown's Landing Road (NPS Route 502)

Borings BL-1 through BL-3 were drilled at offset locations from the roadway pavement for the proposed widening of Brown's Landing road. Borings BL-4 and BL-5 were drilled for the proposed parking lot and turnaround at Indian Mound palisades in the vicinity of the 17th Kentucky Infantry Monument.

Brown silty clay with some sand and trace of chert (A-4, A-6) was encountered in all borings. A brown silty sand with trace of chert layer was encountered to a depth of 0.61 m in Boring BL-1 (A-2-4). Moisture contents varied from 3.7 to 26.3%. Liquid limit ranged from 42 to 52, plasticity indices from 12 with 18 and 48 to 61% fines. Standard Penetration Test (SPT) resistances encountered within the silty clay ranged from 3 to 19 blows per 300 mm suggesting soft to very stiff consistencies. Laboratory test results for the Bulk sample are presented in Table 1.

The pavement generally contains low to moderate severity fatigue and longitudinal cracking at a few locations between the intersection of Browns Landing and Eastern Corinth roads and the Indian Mounds palisades.

Pittsburg Landing Road I (NPS Route 13)

The AC thickness encountered in Borings PLI-1 through PLI-5 varied between 70 to 110 mm overlaying 40 to 120 mm of aggregate base.

Red and brown clay with varying amounts of silt and traces of sand (A-6) was encountered in all borings . Laboratory test results indicate moisture contents between 12.0% and 20.3%, liquid limits between 28 and 39, plasticity indices between 12 and 22 with 40.7% to 82.9% fines. SPT resistances encountered ranged from 5 to 25 blows per 300 mm suggesting medium stiff to very stiff consistencies. Borings PLI-9, PLI-10 and PLI-11 were drilled in the proposed relocation section of the road east of Chambers Field to the Visitor and Cemetery parking areas. Laboratory test results for the bulk samples are presented in Table 1. Four pavement cores were obtained from Borings PLI-6 through PLI-8 and PLI-12.

The pavement generally contains low to moderate fatigue cracking at a few locations within the roadway.

Boring V-1 was drilled for the vista off Brown's Landing road. Brown silt with trace sand, clay and chert (A-4) was encountered to the termination depth of 2.95 m. Laboratory test results indicate a natural moisture content of 18.5%, a liquid limit of 32, non-plastic plasticity index and 85.0% fines. SPT resistances varied from 3 to 81 blows per 300 mm indicating soft to hard consistencies.

Boring S-1 was drilled in the maintenance service road between the existing and proposed Pittsburg Landing road I alignments. The AC thickness encountered in Boring S-1 was 90 mm underlain by 100 mm aggregate base.

Beneath the pavement, brown clay with trace silt and sand (A-7-6) was encountered to the termination depth of 1.52 m. Laboratory test results indicate a natural moisture content of 15.4%, a liquid limit of 45, a plasticity index of 27 and 90.4% fines. SPT resistances ranged from 32 to 39 blows per 300 mm indicating hard consistency.

Visitor Center and Cemetery Parking Areas

The AC thickness encountered in Borings VC-1 through VC-6 varied between 70 to 130 mm overlaying 90 to 220 mm of aggregate base.

Brown and red clay and silty clay with trace to some fine to medium sand (A-6) was encountered in all borings. Laboratory test results indicate a natural moisture content of 9.3%, a liquid limit of 30, a plasticity index of 6 with 38.4% fines. SPT resistances encountered ranged from 5 to 38 blows per 300 mm indicating medium stiff to hard consistencies.

The pavement generally contains low to moderate severity fatigue and longitudinal cracking at a few locations within the parking area.

Pittsburg Landing Road II

The AC thickness encountered in Borings PLII-1 through PLII-3 varied between 70 and 90 mm overlaying 70 to 120 mm of aggregate base.

Beneath the pavement in Boring PLII-3, fill and/or disturbed soils consisting of silty sand and clay with trace of chert (A-2-4) were encountered to a depth of 1.52 m. Laboratory test results indicate natural moisture content ranged from 11.3% to 11.8%, liquid limits from 21 to 24, a non-plastic plasticity index with 25.5 to 27.3% fines. SPT resistances encountered within the fill varied from 3 to 7 blows per 300 mm, generally suggesting very loose to loose conditions.

Red and brown clay with varying amounts of silt (A-4) was encountered to the termination depth of Borings PLII-1, PLII-2 and below the fills in Boring PLII-3. Laboratory test results indicate natural moisture contents ranged from 12.4% to 18.2%, liquid limits from 32 to 34, plasticity indices from 15 to 17 and 82.6 to 85.0 percent fines. SPT N-values ranged from 6 to 13 blows per 300 mm, generally indicating medium stiff to stiff consistencies.

The pavement generally contains low severity fatigue and block cracking.

Reconnoitering Road

The AC thickness encountered in Borings R-1 through R-3 was 80 mm overlaying 60 to 70 mm of aggregate base.

Beneath the pavement, reddish brown and brown clay with some silt and trace fine sand (A-7-6) was encountered to the termination depth of all borings. Laboratory results indicate natural moisture contents ranged from 17.2% to 18.8, liquid limits from 47 to 48, plasticity indices from

22 to 26 with 79.4 to 85.4% fines. SPT resistances encountered ranged from 9 to 29 blows per 300 mm suggesting stiff to very stiff consistencies.

The pavement generally contains minimal low severity fatigue and longitudinal cracking.

Bridge Replacement on Reconnoitering Road

Borings BB-1 and BB-2 were drilled for the foundations of the replacement bridge/culvert. Brown and gray silty sand and sand with trace weathered rock fragments and clay (A-2-4) was encountered to a depth of 2.54 m in Boring BB-1 and to the bottom of Boring BB-2. SPT resistances varied between 2 to 30 blows per 300 mm indicating very loose to medium dense conditions. In Boring BB-2, a high SPT resistance of 65 blows per 300 mm was encountered at an approximate depth of 2.0 m. This high SPT resistance is suspected to be because a random boulder was encountered and is not representative of the general subsurface conditions.

Beneath the sands in Boring BB-1, brown and gray silty clay with trace sand (A-7-6) was encountered to the termination depth of 4.98 m. Laboratory test results indicate a natural moisture content of 38%, a liquid limit of 71, a plasticity index of 44 with 90.0% fines. SPT resistances varied from 2 to 6 blows per 300 mm suggesting very soft to medium stiff consistencies.

Corinth-Pittsburg Landing Road

RPCC thickness in Borings CP-1 through CP-12 varied between 120 to 160 mm. No aggregate base was encountered in any of the borings.

Beneath the pavement in Borings CP-1 through CP-6 and CP-10, brown and gray silty clay with trace of sand, chert and gravel (A-6) was encountered to the termination depth of the borings. Laboratory test results indicate natural moisture contents ranged from 11.6% to 24.9%, liquid limits from 33 to 37, plasticity indices from 15 to 17 with 77.8% to 88.1% fines. SPT resistances encountered ranged from 6 to 29 blows per 300 mm suggesting medium stiff to very stiff consistencies.

Gray and brown silty sand with trace to some clay and trace gravel (A-2-4, A-4) were encountered to the termination depths of Borings CP-7 through CP-9, CP-11 and CP-12. Laboratory test results indicate natural moisture contents ranged from 13.2 to 27.5%, liquid limits from 18 to 27, plasticity indices from non-plastic to 11 with 30.8 to 59.2% fines. SPT resistances encountered ranged from weight of hammer (WOH) to 21 blows per 300 mm suggesting very loose to medium dense conditions.

Corinth-Pittsburg Landing road consists of approximately 862 RPCC slabs (431 slabs in each direction) typically 12.2 m long by 3.0 m wide. Low to high severity transverse and longitudinal cracks, corner breaks, spalling and blow outs were observed within 33% of the RPCC slabs and slab joints. The slab number and type of distress observed are listed on Table 1 in Appendix F.

New Entrance Road

The thickness of the asphalt surface treatment course encountered in Borings E-1 and E-2 varied from 30 to 40 mm overlaying 40 to 130 mm of aggregate base.

Beneath the pavement, brown and reddish brown clay with trace silt and sand (A-6, A-7-6) were encountered to the termination depths of the borings. Laboratory test results indicate natural moisture contents ranged from 20.1 to 21.9%, liquid limits from 40 to 48, plasticity indices from 19 to 26 and 69.4 to 84.0% fines. SPT resistances encountered ranged from 2 to 15 blows per 300 mm indicating very soft to stiff consistencies.

The pavement contains several 25 to 75 mm deep ruts and settlement.

McClernand Road

The AC thickness encountered in Borings MS-1 through MS-5 varied from 30 to 100 mm with an average thickness of 75 mm. No aggregate base was encountered underlying the AC.

Beneath the pavement, brown and reddish brown clay and silty clay with trace sand (A-6) was encountered to the termination depth of all borings. Laboratory test results indicate natural moisture contents ranged from 17.0% to 25.8%, liquid limits from 32 to 39, plasticity indices from 14 to 18 and 90.5% to 97.1% fines. SPT resistances encountered ranged from 2 to 22 blows per 300 mm indicating very soft to very stiff consistencies.

Eastern Corinth Road I (NPS Route 14)

The AC thickness encountered in Borings EC-1 through EC-3 varied from 90 to 110 mm overlaying 100 to 140 mm aggregate base.

Beneath the pavement, brown clay with some silt and trace sand (A-6, A-7-6) was encountered to the termination depth of all borings. Laboratory test results indicate natural moisture contents varied from 14.1% to 19.4%, liquid limits from 37 to 45, plasticity indices from 17 to 27 and 68.0% to 87.9% fines. SPT resistances encountered ranged from 9 to 16 blows per 300 mm indicating stiff to very stiff consistencies.

The results of the pavement condition survey for Eastern Corinth Road I are listed in Table 2.

TABLE 2 - PAVEMENT DISTRESS - EASTERN CORINTH ROAD I

Approximate Stations	Severity and Type of Pavement Distress [1)]
10+000 to 10+150	L to H fatigue and longitudinal cracking, full lane
10+175 to 10+290	M to H fatigue, block and cracking, 25 to 75 mm ruts, full lane

Approximate Stations	Severity and Type of Pavement Distress [1]
10+650 to 10+670	M fatigue cracking, raveling and potholes, SB lane, full
10+685 to 10+710	H raveling and M longitudinal, full
10+820 to 10+850	L fatigue and longitudinal, full
10+950 to 10+970	L fatigue and raveling, full
11+082	H transverse cracking
11+088 to 11+095	H fatigue, full

1) L, M, H = Low, Moderate and High Severity

Peabody Road (NPS Route 501)

The AC thickness encountered in Borings RS-1 through RS-3 and pavement cores RS-4 through RS-5 varied from 70 to 160 mm with and average thickness of 112 mm. The aggregate base thickness varied from 0 to 140 mm.

Beneath the pavement, brown silty clay and sandy clay (A-6, A-7-6) were encountered to the termination depth of all borings. Laboratory test results indicate natural moisture contents ranged from 15.2% to 22.2%, liquid limits from 29 to 41, plasticity indices from 11 to 19 and 57.9% to 95% fines. SPT resistances varied from 3 to 18 blows per 300 mm indicating soft to very stiff consistencies.

The pavement generally contains low severity fatigue cracking at a few locations.

Hamburg-Savannah Road (NPS Route 11)

The AC thickness encountered in Borings HS-1 through HS-4 varied from 60 to 90 mm with an average thickness of 75 mm. No aggregate base was encountered.

Beneath the pavement, brown clay and silty clay with trace to some sand was encountered to the termination depth of all borings. SPT resistances varied from 3 to 34 blows per 300 mm indicating soft to hard consistencies.

The pavement generally contains low to medium severity fatigue, longitudinal and block cracking at several locations within the roadway. High severity transverse cracking was encountered between approximate stations 10+600 and 10+650 at 10 m intervals.

Johnston Memorial

Brown silty sand with trace chert and clay (A-4) was encountered in Boring J-1 to the termination depth of 2.74 m. Laboratory test results indicate a natural moisture content of 6.9%, liquid limit of 36, non-plastic plasticity index and 49.3% fines. SPT resistances varied

from 16 to 100+ blows per 300 mm indicating very stiff to hard consistencies.

Two cores (J-2 and J-3) were retrieved from the parking area. The AC thickness encountered in these cores ranged from 70 to 90 mm with no aggregate base.

The pavement generally contains high severity fatigue and block cracking and potholes in the area surrounding the monument and near the exit from the parking area.

Peach Orchard Parking

The AC thickness encountered in Borings PO-1 and PO-2 varied from 60 to 70 mm with no aggregate base.

Beneath the pavement, brown clay with some silt and trace sand (A-6) was encountered to the termination depth of both borings. Laboratory test results indicate natural moisture contents ranged from 18.9% to 22.9%, a liquid limit of 37, a plasticity index of 18 with 92.8% fines.

Bloody Pond Tour Stop

The AC thickness encountered in Borings BP-1 and BP-2 varied from 60 to 90 mm with no aggregate base.

Beneath the pavement in Boring BP-1, reddish brown silt with trace clay and sand (A-4) was encountered to the termination depth of 2.1 m. Laboratory test results indicate a natural moisture content of 20.4%, a liquid limit of 31, non-plastic plasticity index and 88.4% fines. SPT resistances ranged from 7 to 22 blows per 300 mm indicating stiff to very stiff consistencies.

Beneath the pavement in Boring BP-2, brown sandy clay with trace silt (A-6) was encountered to the termination depth of the boring. Laboratory test results indicate a natural moisture content of 15.7%, a liquid limit of 32, a plasticity index of 13 and 69.1% fines. SPT resistances ranged from 9 to 18 blows per 300 mm indicating stiff to very stiff consistencies.

Groundwater

No groundwater was encountered during or after completion of drilling in any of the borings. Fluctuations in the groundwater level due to seasonal and climatic effects should be expected.

ANALYSIS AND CONCLUSIONS

Pavements

Flexible pavement design analyses were conducted for overlay, reconstruction and new construction areas using the 1997 AASHTO Pavement Design, DARWin(tm) Pavement Design

System (version 3.01). DARWin was used to determine the future structural number (SN) for each pavement section. Flexible pavement design analyses were conducted for a 20-year design period. The design analyses to determine the 80-kN equivalent single axle loads (ESAL's) were performed using the Rigorous ESAL Calculation in DARWin and were based upon traffic count and vehicle classification data obtained from the Design Scoping Report. Initial Average Daily Traffic (ADT) values were estimated from the reported 1995 ADT values by figuring a 2 percent annual growth from 1995. The effective roadbed soil resilient modulus was determined from the CBR tests that were correlated to the resilient modulus (M_R). Resilient moduli used for the analysis were 62055 and 72398 kPa, which correspond to CBR's of 6 and 7, respectively. Other parameters specified in the analyses include a reliability of 85 percent, and overall standard deviation of 0.49, an initial serviceability index of 4.2, and a terminal serviceability index of 2.2. The results of the pavement design analysis are presented in Appendix G.

For constructibility reasons, analyses of new pavement sections and reconstruction areas considered a minimum section consisting of 40 mm of SACP surface course (12.5 mm NMSA); 60mm of SACP base course (19 mm NMSA) and 200mm of aggregate base (grading C or D). Also, for constructability reasons, analyses of overlay sections considered a minimum course of 40 mm SACP (12.5 mm NMSA).

Structural plate-arch pipe Foundations

The foundations for the proposed structural plate pipe-arch on Reconnoitering road were analyzed. Bearing capacity analysis was performed for spread footings based on assumed footing widths of 1.5, 2.0 and 2.5 m and a length of 6.5 m. Allowable bearing capacity calculations were performed using methods from AASHTO Standards for design of Highway Bridges (AASHTO, 1996) and Foundation Analysis and Design, Bowles, 1996. Calculations were performed assuming a 0.76 m overburden below the stream bed. Results for no overburden are also presented in the recommendations section. The results of the spread footings analysis are presented in Tables 3 and 4. Bearing capacity calculations are presented in Appendix D. Calculated total settlements for the spread footings at the allowable loads are expected to be 15, 20 and 25 mm, respectively. No scour data was available at the time of writing this report. Once scour data is provided, these foundation recommendations will be verified or revised as required.

TABLE 3 - ALLOWABLE BEARING CAPACITY RESULTS ASSUMING 0.76 m OVERBURDEN

Footing Dimensions (m)	Ultimate Bearing Capacity (KPa)	Factor of Safety	Allowable Bearing Capacity (KPa)
6.5 x 1.5	426	3	142
6.5 x 2.0	495	3	165
6.5 x 2.5	537	3	179

TABLE 4 - ALLOWABLE BEARING CAPACITY RESULTS ASSUMING NO OVERBURDEN

Footing Dimensions (m)	Ultimate Bearing Capacity (KPa)	Factor of Safety	Allowable Bearing Capacity (KPa)
6.5 x 1.5	183	3	61
6.5 x 2.0	249	3	83
6.5 x 2.5	300	3	100

RECOMMENDATIONS

Pavements

The following pavement recommendations are based on the pavement condition survey performed during August 1999, subsurface exploration and laboratory test results and analysis.

General - The recommended general procedure for rehabilitation of the roadways, turnarounds and parking areas consists of full-depth spot reconstruction followed by an SACP overlay. It is recommended to place 0.75 m wide strips of paving geogird over existing low to high severity fatigue, longitudinal and transverse cracks prior to placing the overlay.

It is recommended the pavement reconstruction and new construction areas to consist of 40 mm of SACP surface course, 60 mm of SACP base course and 200 mm aggregate base (grading C or D). The recommended SACP surface and base courses mix designs for the project are 12.5 mm nominal maximum size aggregate (NMSA), $<0.3 \times 10^6$ EASL's and 19 mm NMSA, $<0.3 \times 10^6$ EASL's; respectively.

Recommendations for each specific site are presented below.

Brown's Landing Road (NPS Route 502)

It is recommended to overlay Brown's Landing road using 50 mm SACP overlay (12.5 mm NMSA). It is recommended to use the above described pavement section for widening of the road.

Pittsburg Landing Road I (NPS Route 13)

It is recommended to overlay Pittsburg Landing I road using 50 mm SACP overlay. It is recommend to construct the realigned section of Pittsburg Landing road I using 40 mm of SACP surface course, 60 mm of SACP base course and 200 mm aggregate base (grading C or D).

Visitor Center and Cemetery Parking Areas

It is recommended to overlay the Visitor Center and Parking area using 50 mm SACP overlay. Pavement reconstruction areas within the parking lot are recommended to consist of 40 mm of SACP surface course, 60 mm of SACP base course and 200 mm aggregate base (grading C or D).

Pittsburg Landing Road II

It is recommended to overlay Pittsburg Landing II road using 50 mm SACP overlay.

Reconnoitering Road (NPS Route 500)

It is recommended to overlay Reconnoitering road using 50 mm SACP overlay.

Corinth-Pittsburg Landing Road (NPS Route 12)

Based on the pavement condition survey and scoping report, RPCC slab replacement and joint repair are the recommended rehabilitation procedures. Approximately 33% of the RPCC slabs will require replacement. It is recommended to clean and seal all longitudinal and transverse joints. A list of the slab numbers, type of defects and recommended replacement or joint repair is presented in Table 1 in Appendix F.

Entrance Road

Based on the pavement condition survey, it is recommended to place an SACP wedge and level course prior to placement of the AC overlay for the existing portion of the Entrance road that is to remain in use. The overlay is recommended to consist of 65 mm SACP overlay (12.5 mm NMSA).

Based on the information provided by Project Development, the new Entrance road will be realigned. It is recommended to construct the new roadway alignment using the minimum recommended pavement section described previously.

McClernand Road

It is recommended to overlay McClernand road using 65 mm SACP overlay (12.5 mm NMSA).

Eastern Corinth road I (NPS Route 14)

It is recommended to overlay Eastern Corinth road I using 50 mm SACP overlay (12.5 mm NMSA). Prior to placement of the SACP overlay, perform spot reconstruction or place a paving geogrid at the locations shown in Table 5.

TABLE 5 - SPOT RECONSTRUCTION AND PAVING GEOGRID RECOMMENDATIONS

Approximate Stations	Lane Width	Reconstruction Type
10+000 to 10+150	Both lanes, full	Full-depth spot reconstruction
10+175 to 10+290	Both lanes, full	Full-depth spot reconstruction, part of the realignment
10+650 to 10+670	SB lane, full	Full-depth spot reconstruction
10+685 to 10+710	Both lanes, full	Paving geogrid
10+820 to 10+850	Both lanes, full	Paving geogrid
11+082	Both lanes, full	Paving geogrid
11+088 to 11+095	Both lanes, full	Full-depth spot reconstruction

Peabody Road (NPS Route 501)

It is recommended to overlay Peabody road using 50 mm SACP overlay (12.5 mm NMSA).

Hamburg-Savannah Road (NPS Route 11)

It is recommended to overlay Hamburg-Savannah road using 70 mm overlay (12.5 mm NMSA). Prior to placement of the overlay full-depth spot reconstruction should be performed in the area between stations 10+780 and 10+900. It is recommended to place paving geogird on the transverse cracks between stations 10+600 and 10+650.

New One-way Loop Around Tent Hospital Site

It is recommended to construct the new one-way loop using 40 mm SACP surface course, 60 mm SACP base course and 200 mm aggregate base (grading C or D).

Johnston Memorial

Based on the pavement condition survey, it is recommended to perform full-depth spot reconstruction in the area around the memorial at the locations shown on the drawing in Appendix B. Full-depth spot reconstruction is recommended to consist of 40 mm SACP surface course, 60 mm SACP base course and 200 mm aggregate base course (grading C or D).

Peach Orchard Parking

For widening of Peach Orchard Parking area, it is recommended to use the minimum recommended pavement section consisting of 40 mm SACP surface course, 60 mm SACP

base course and 200 mm aggregate base course.

Bloody Pond Tour Stop

It is recommended to use 40 mm SACP surface course, 60 mm SACP base course and 200 mm aggregate base course for reconstruction of the roadway and 2 turnouts at Bloody Pond Tour Stop.

Foundations - Structural plate-arch pipe

It is recommended to support the new structural plate pipe-arch on Reconnoitering road on spread footings founded on competent soils. Allowable bearing capacities for footing widths of 1.5, 2.0 and 2.5 m are 142, 165 and 179 KPa, respectively, assuming 0.76 m of overburden. Allowable bearing capacities were also calculated assuming no overburden for footing widths of 1.5, 2.0 and 2.5 m as 61, 83 and 100 KPa, respectively. Total settlements are estimated at 15, 20 and 25 mm based on allowable bearing pressures of 142, 165 and 179 KPa, respectively. Differential settlements are expected to be approximately half of the total settlement values.

Culverts

Metal pipe culvert service life can be estimated based on a pH of 4.5 and a minimum electrical resistivity of 10,000 ohm-cm.

Construction Considerations

The majority of the subgrade soils at the project site are moderate to high plasticity clay. Some subexcavation and replacement with unclassified borrow (or better) is anticipated in spot reconstruction and new construction areas. It is recommended to include a quantity of 250 cubic meter of subexcavation and replacement in the contract.

DISCLAIMER/LIMITATIONS CLAUSE

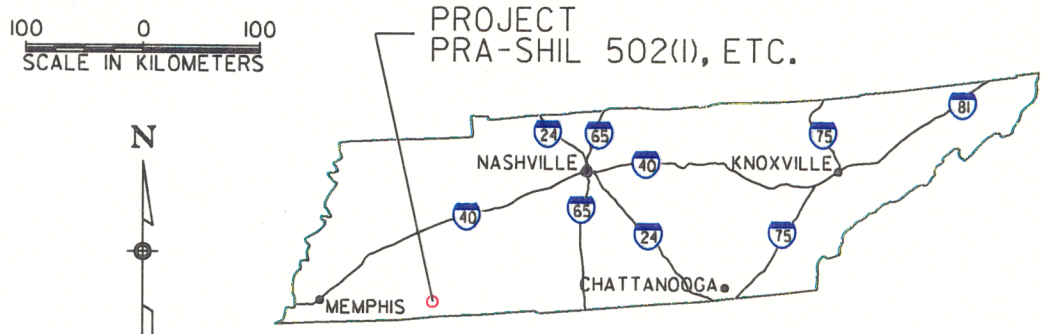
The subsurface explorations and tests described in the section on Procedures and Results have been conducted in accordance with standard practices and procedures (except as specifically noted). The results of these explorations and tests represent conditions at the specific locations indicated. Subsurface conditions between these locations may vary. The Analysis and Conclusions sections and the Recommendations section in this report include interpretations and recommendations developed by the Government in the process of preparing the design. These interpretations are not intended as a substitute for the personal investigation, independent interpretation, and judgment of the Contractor.

Prepared by:
Khalid T. Mohamed
Geotechnical and Pavement Engineer

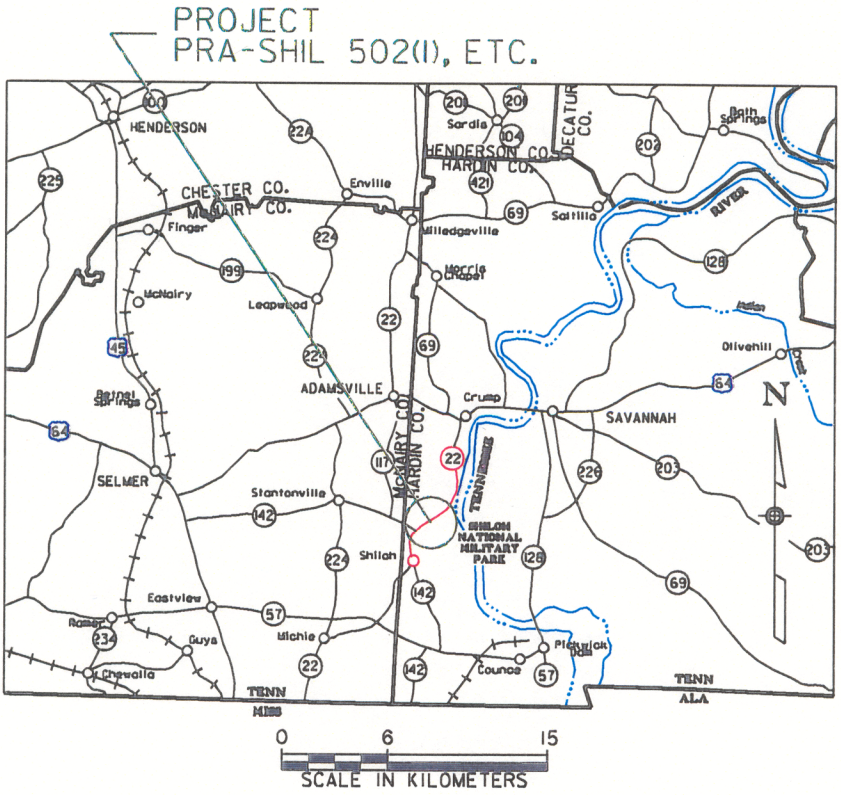
Reviewed by:
William Bassett, P.E.
Supervisory Geotechnical Engineer

APPENDIX A - Figures

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
SE	TENN	PRA-SHIL 502(1), ETC.		



KEY MAP STATE OF TENNESSEE



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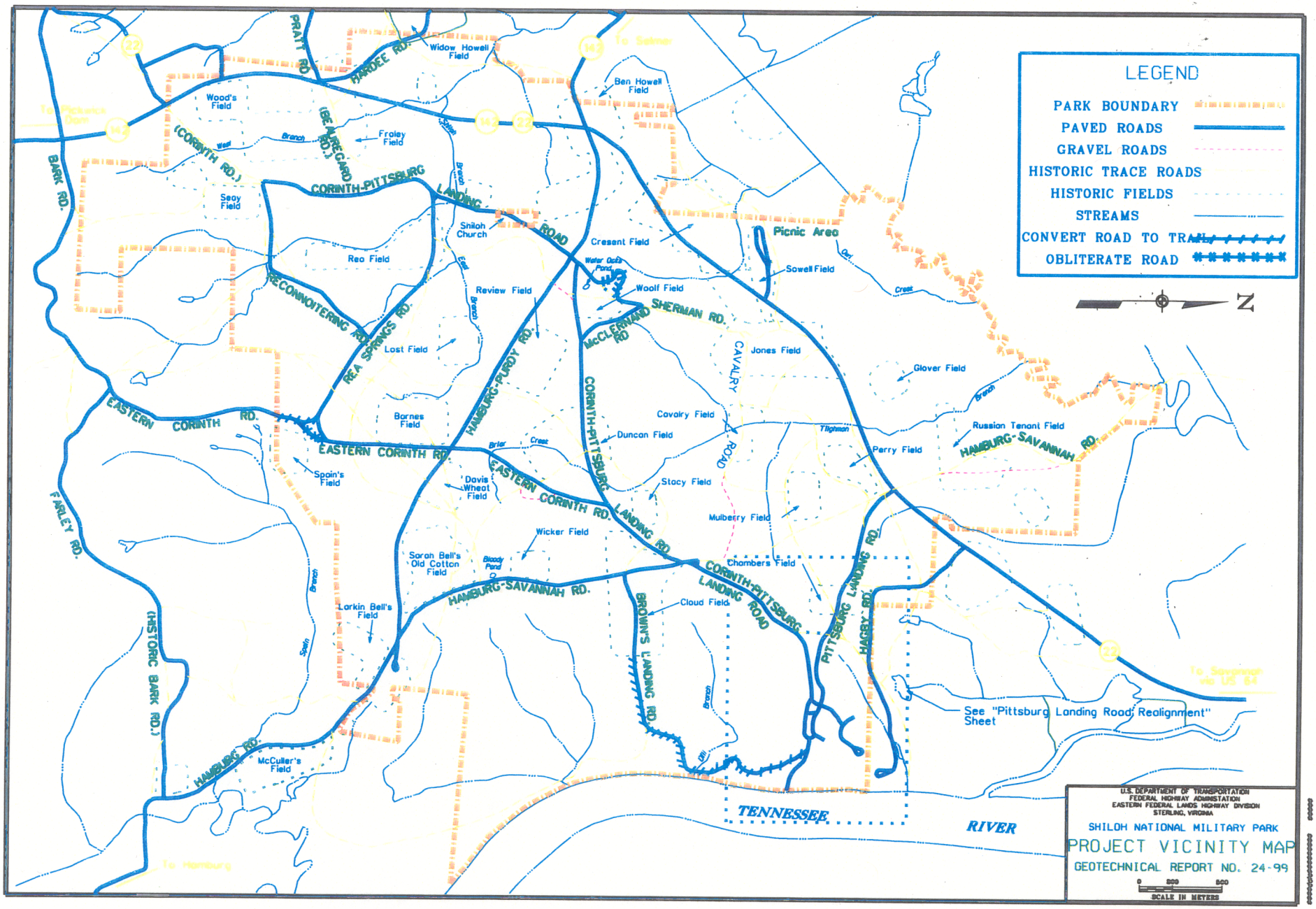
STERLING, VIRGINIA

LOCATION MAP

FIGURE 1

GEOTECHNICAL REPORT 24-99


LEGEND
PARK BOUNDARY
PAVED ROADS
GRAVEL ROADS
HISTORIC TRACE ROADS
HISTORIC FIELDS
STREAMS
CONVERT ROAD TO TRAIL
OBLITERATE ROAD
N
PRATT RD.
HARDEE RD.
Widow Howell Field
Ben Howell Field
To Selmer
To Pickwick Dam
Wood's Field
(BEAUREGARD RD.)
(CORINTH RD.)
Froley Field
Seay Field
BARK RD.
CORINTH-PITTSBURG LANDING ROAD
Shiloh Church
Cresent Field
Picnic Area
Sowell Field
Water Oak Pond
Woolf Field
Rea Field
Review Field
RECONNOITERING RD.
REA SPRINGS RD.
SHERMAN RD.
McCLERNAND RD.
HAMBURG-PURDY RD.
Lost Field
Jones Field
CAVALRY ROAD
Glover Field
Barnes Field
EASTERN CORINTH RD.
Cavalry Field
Duncan Field
Russian Tenant Field
HAMBURG-SAVANNAH RD.
Perry Field
Spain's Field
Davis Wheat Field
Stacy Field
Mulberry Field
Wicker Field
Sarah Bell's Old Cotton Field
Chambers Field
CORINTH-PITTSBURG LANDING ROAD
PITTSBURG LANDING RD.
HAGEY RD.
Larkin Bell's Field
Cloud Field
BROWN'S LANDING RD.
(HISTORIC BARK RD.)
McCuller's Field
HAMBURG RD.
To Hamburg
To Savannah via US 64
See "Pittsburg Landing Road Realignment" Sheet
TENNESSEE
RIVER
U.S. DEPARTMENT OF TRANSPORTATION
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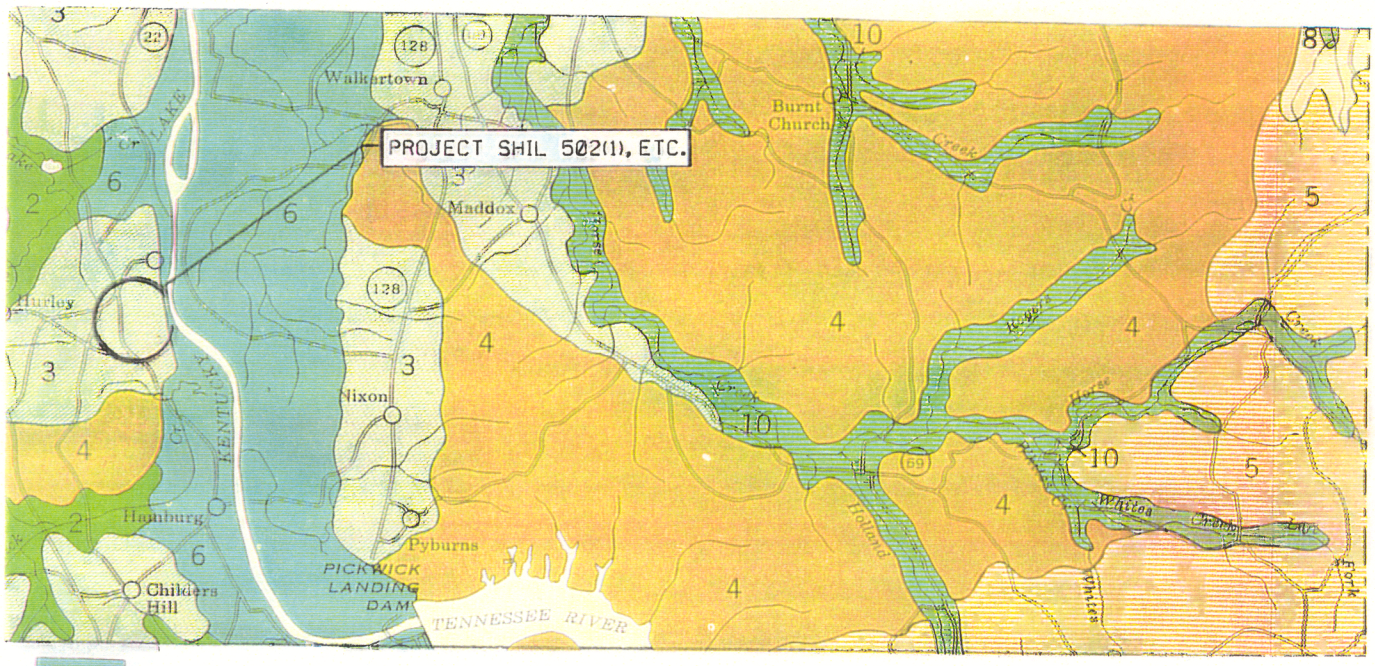
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
SHILOH NATIONAL MILITARY PARK
PROJECT VICINITY MAP
GEOTECHNICAL REPORT NO. 24-99
0 500 1000
SCALE IN METERS

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
SE	TNN	PRA-SHIL 502(1), ETC.		

SOILS MAP



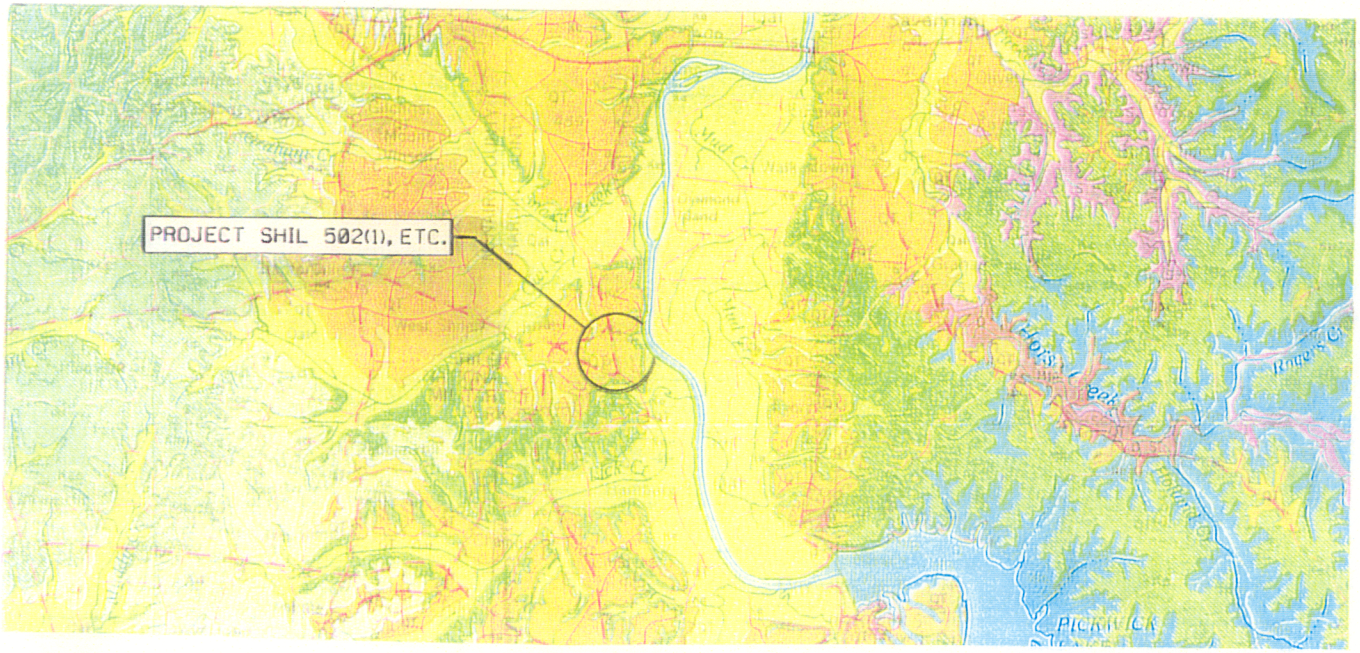
6 WOLFTEVER-BEASON-EGAM ASSOCIATION

NEARLY LEVEL SOILS ON LOW STREAM TERRACES AND FLOOD PLAINS OF THE TENNESSEE RIVER

3 PADEN-PICKWICK-WAYNESBORO ASSOCIATION

MODERATELY WELL DRAINED SOILS AND WELL DRAINED SOILS ON HIGH TERRACES

GEOLOGIC MAP



Qt HIGH-LEVEL ALLUVIAL DEPOSITS

IRON-STAINED GRAVEL, SAND, SILT, AND CLAY; VARIABLE IN THICKNESS BUT GENERALLY LESS THAN 60 FEET THICK.

Qa ALLUVIAL DEPOSITS

SAND, SILT, CLAY, AND GRAVEL; GENERALLY LESS THAN 20 FEET THICK.

Ke EUTAW FORMATION

GRAYISH-GREEN SAND, FINE-GRAINED, GLAUCONITIC, MICACEOUS; INTERBEDDED WITH GRAY LAMINATED CLAYS WHICH COMMONLY CONTAIN CARBONIZED OR SILICIFIED WOOD. THICKNESS 0 TO 180 FEET; THINS NORTHWARD.

Kc COFFEE SAND

LOOSE, FINE-GRAINED SAND, LIGHT-GRAY, SPARSELY GLAUCONITIC, LOCALLY INTERBEDDED WITH LAMINATED LIGNITIC CLAY. THICKNESS 25 TO 200 FEET; THINS NORTHWARD.

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GEOLOGY MAPS

FIGURE 3

GEOTECHNICAL REPORT 24-99

APPENDIX B - Boring Location Plan

NPS NO.	REG	STATE	PROJECT	SHEET NO.
000 / 00000	SE	TN	PRA-SHIL 502(1), ETC.	

N

Begin pavement widening and 50 mm HACP, class B, grading D overlay 1+002.8

HAMBURG-SAVANNAH ROAD

BROWN'S LANDING ROAD

BL-1

BL-2

BL-3

BL-4

BL-5

Widen existing one-way road and convert to two-way traffic. See Typical Sections for pavement structure.

Construction C/L

POC 1+000.0 Brown's Landing Road
POC 81+824.0 Hamburg-Savannah Road

See Brown's Landing Parking Area Plan for more information

End pavement widening and 50 mm HACP, class B, grading D overlay 1+486.6

Kentucky Regiment Monument

POC 1+469.1 Brown's Landing Road
POT 0+000.0 Brown's Landing Parking Area

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STERLING, VIRGINIA

SHILOH NATIONAL MILITARY PARK

BORING LOCATIONS PLAN

BROWN'S LANDING ROAD
1+000 to 1+350

0 10 20
SCALE IN METERS

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
000 / 00000	SE	TN	PRA-SHIL 502(1), ETC.	

Begin 50 mm HACP class B,grading D overlay
Pittsburg Landing Road 20+012.2

TN ROUTE 22

POT 20+000.000

20+000

20+050

20+100

20+150

20+200

20+250

20+300

20+350

20+400

20+450

20+500

20+550

20+600

20+650

20+700

PLI-1

PLI-2

PLI-3

PITTSBURG LANDING ROAD

Existing 600 mm x 21 m CMP with stone end sections to remain

Limit of paving

10.0

6.4

9.8

10.1

20+095 to 20+145 Rt.
Overlay existing turnout

20+290 to 20+320 Rt.
Overlay existing turnout

Construction C/L

Existing 450 mm x 16 m CMP,drop inlet and concrete headwall to remain

Headquarters monument

20+505 to 20+545 Rt.
Remove 24 m of PCC curb
and overlay existing turnout

Existing 600 mm x 17 m CMP with stone end sections to remain

N

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BORING LOCATION PLAN

PITTSBURG LANDING ROAD
20+000 to 20+700

SCALE IN METERS 0 10 20

Sheet 1 of 3

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
000 / 00000	SE	TN	PRA-SHIL 502(11), ETC.	

N

20+700 20+750 20+800 20+850 20+900 20+950 21+000 21+050

20+830 to 20+875 Remove 22 m of FCC curb and overlay existing turnout.

Headquarters monument

PLI-4

Existing 450 mm x 14 m CMP with stone end sections to remain

6.4 9.8

PITTSBURG LANDING ROAD

Construction C/L

PLI-5

POT 30+000.000

50.000

S 25° 52' 07.23" W

20+932 to 20+960 Rt. Eliminate existing turnout

COLUMBIA-SAVANNAH HIGHWAY

20+980 to 21+020 Rt. Eliminate existing turnout

POC 20+971.3 Pittsburgh Landing Road

POT 30+000.0 Corinth-Pittsburgh Landing Road

PC 30+037.754

N

End overlay/Begin realignment Pittsburg Landing Rd. 21+165.0

21+050 21+100 21+150 21+200 21+250 21+300 21+350 21+400

Remove or abandon existing 450 mm x 16.5 m CMP

21+110 to 21+160 Rt. Eliminate existing turnout

PITTSBURG LANDING ROAD

Construction C/L

PLI-9

PC 21+284.361

Curve PITT13-6

PLI-10

PC 21+315.559

PC 21+401.34

10.0

S 72° 39' 09.14" E

6.4

13.6

N 8° 12' 00" E 54.61

21+166 to 21+207 Rt. Construct paved turnout

21+338 to 21+379 Rt. & Lt. Construct two paved turnouts

Curve PITT13-6
Δ = 20° 19' 56.09" (LT)
R = 150.000 m
T = 26.898 m
L = 53.230 m

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SHILOH NATIONAL MILITARY PARK

BORING LOCATIONS PLAN

PITTSBURG LANDING ROAD
20+700 to 21+400

0 10 20
SCALE IN METERS

Sheet 2 of 3

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
000 / 00000	SE	TN	PRA-SHIL 502(1), ETC.	

30+700 30+750 30+800 30+850 30+900 30+950 31+000 31+050

N

Remove 460 mm x 21 m clay pipe & stone headwall. Install 100 mm x 22 m PC & 2 stone headwalls. Place rip rap, class 3 at pipe inlet and outlet.

CORINTH-PITTSBURG LANDING ROAD

Construction C/L

HAMBURG-SAWANNAH ROAD

POT 82+14.562

82+100

30+945 Rt. Obliterate gravel turnout by NPS.

Existing 405 mm x 120 m RCP. 5 inlets, type 6B & stone headwall to remain. Place riprap, class 3 at pipe outlet.

Low Wallace Trace

50mm gate valve

GV

82+000 31+150 31+200 31+250 31+300 31+350 31+400

N

82+050 31+100

31+050 82+100

Existing 600 mm x 8 m RCP & stone headwall to remain. Remove 1 stone headwall.

CP-2

Obliterate gravel turnout 31+305 Rt.

Replace asphalt turnout with RPCC. Replace wooden curb with PCC curb.

CORINTH-PITTSBURG LANDING ROAD

Construction C/L

Remove existing 405 mm x 7.5 m PC. Install 600 mm x 8 m PC & 1 stone headwall.

Obliterate gravel turnout 31+110 Rt.

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CONSTRUCTION PLAN

CORINTH-PITTSBURG LANDING ROAD
30+700 to 31+400

SCALE IN METERS 0 10 20

Sheet 2 of 8

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
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31+400 31+450 31+500 31+550 31+600 31+650 31+700 31+750

N

Existing 1.2 m H x 1.9 m W x 12 m L RCBC & stone headwalls to remain. Place riprap, class 3 at RCBC inlet & outlet.

EASTERN CORINTH ROAD

CORINTH-PITTSBURG LANDING ROAD

62

TM

50mm Ø gate valve

Existing 460 mm x 12 m RCP, stone & concrete headwalls to remain.

Construction C/L

31+685 +/- Rt. Construct 2-car RPCC turnout.

31+750 31+800 31+850 31+900 31+950 32+000 32+050 32+100

N

Existing 1.65 m H x 3.3 m W x 14 m L RCBC & stone headwalls to remain. Place riprap, class 3 at RCBC inlet and outlet.

Sunken Road

Tree Stop #33

CORINTH-PITTSBURG LANDING ROAD

9.0

62

TM

CP-3

Construction C/L

31+903 to 31+960 +/- Rt. Replace asphalt turnout with RPCC. Construct PCC curb.

Existing 480 mm x 10.8 m RCP & 2 stone headwalls to remain.

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STERLING, VIRGINIA

SHILOH NATIONAL MILITARY PARK

BORING LOCATIONS PLAN

CORINTH-PITTSBURG LANDING ROAD
31+400 to 32+100

0 10 20
SCALE IN METERS

Sheet 3 of 8

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
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32+100 32+150 32+200 32+250 32+300 32+350 32+400 32+450

N

Existing 460 mm x 9.9 m RCP & 2 stone headwalls to remain.

Tour Stop #4

CORINTH-PITTSBURG LANDING ROAD

8.7 6.2 TMT TMT

Existing 460 mm x 13 m RCP & 2 stone headwalls to remain.

Construction C/L

32+112 to 32+170 +/- Rt. Replace asphalt turnout with RPCC.

32+450 32+500 32+550 32+600 32+650 32+700 32+750 32+800

N

POT 40+000.000 40+000

Existing 460 mm x 14 m RCP, inlet, type 6B & stone headwall to remain.

Construction C/L

Existing 460 mm x 12 m RCP & 2 stone headwalls to remain.

Existing 460 mm x 17 m RCP & 2 stone headwalls to remain. Place riprap, class 3 at pipe inlet

CORINTH-PITTSBURG LANDING ROAD

TMT TMT TMT

6.2

40+050 40+100

CP-4

POC 32+528.0 Corinth-Pittsburg Landing Road
POT 40+000.0 McClernand Road

McCLERNAND ROAD

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BORING LOCATIONS PLAN

CORINTH-PITTSBURG LANDING ROAD
32+100 to 32+800

0 10 20
SCALE IN METERS

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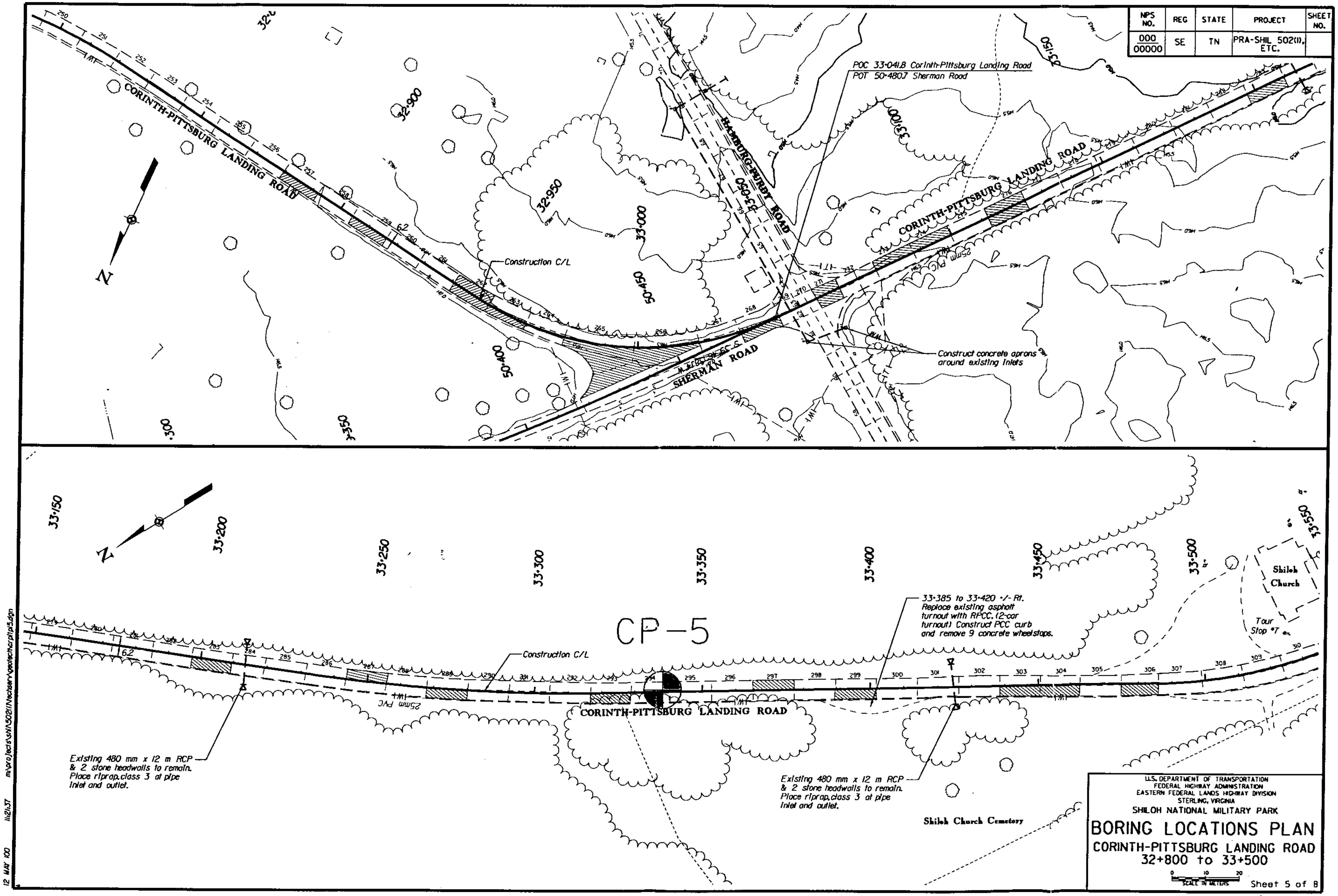

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STERLING, VIRGINIA
SHILOH NATIONAL MILITARY PARK

BORING LOCATIONS PLAN

CORINTH-PITTSBURG LANDING ROAD
32+800 to 33+500

0 10 20
SCALE IN METERS

Sheet 5 of 8

NPS NO.	REG	STATE	PROJECT	SHEET NO.
000 / 00000	SE	TN	PRA-SHIL 502(1), ETC.	

N

33+500
33+550
33+600
33+650
33+700
33+750
33+800
33+850

CP-6
CP-7
CP-8
CP-9

Shiloh Church
WV
Tour Stop #7
10.9

Construction C/L

Existing 480 mm x 13 m RCP & 2 stone headwalls to remain. Place riprap, class 3 at inlet.

Existing 480 mm x 18 m RCP, inlet, type 6B & stone headwall to remain.

CORINTH-PITTSBURG LANDING ROAD

33+485 to 33+545 +/- Rt. Replace existing asphalt turnout with RPCC (2-car turnout). Construct PCC curb.

Clean existing 2-1.8 m H x 7.75 m W x 13 m L RCBC. 2 stone headwalls to remain. Place riprap, class 3 at RCBC inlet and outlet.

Existing 2-1.8 m H x 2.75 m W x 13 m L RCBC with 2 stone headwalls, to remain. Remove silt from box culvert. Place riprap, class 3 at inlet and outlet.

33+850
33+900
33+950
34+000
34+050
34+100
34+150
34+200
34+250

PEABODY ROAD

N

Construction C/L

Existing 480 mm x 12 m RCP & 2 stone headwalls to remain. Place riprap, class 3 at pipe inlet.

Remove existing 405 mm x 18.5 m clay/RCP and 2 stone headwalls. Install 450 mm x 19 m PC & 2 stone headwalls.

CORINTH-PITTSBURG LANDING ROAD

6.2

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BORING LOCATIONS PLAN

CORINTH-PITTSBURG LANDING ROAD
33+500 to 34+200

0 10 20
SCALE IN METERS

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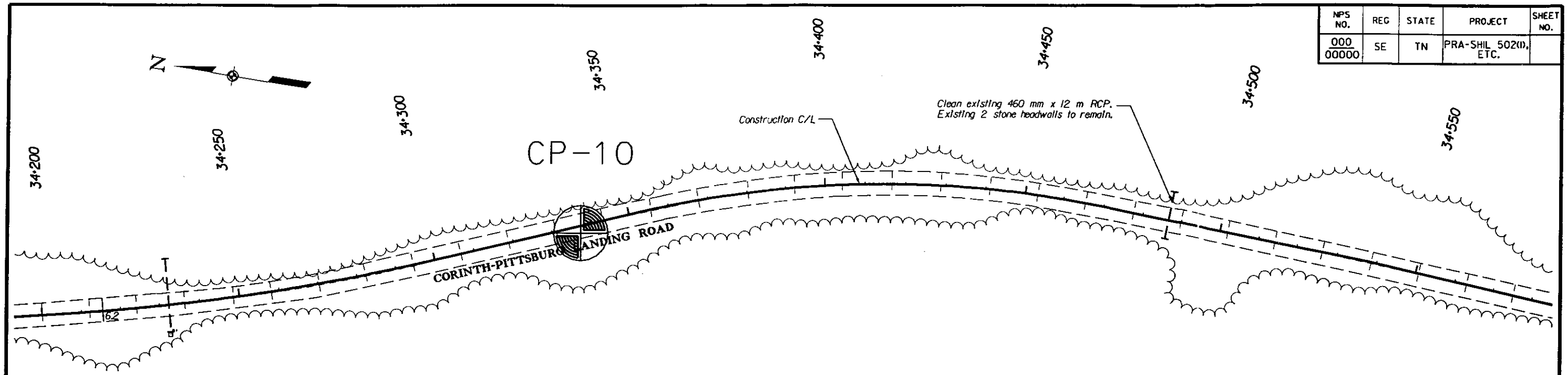

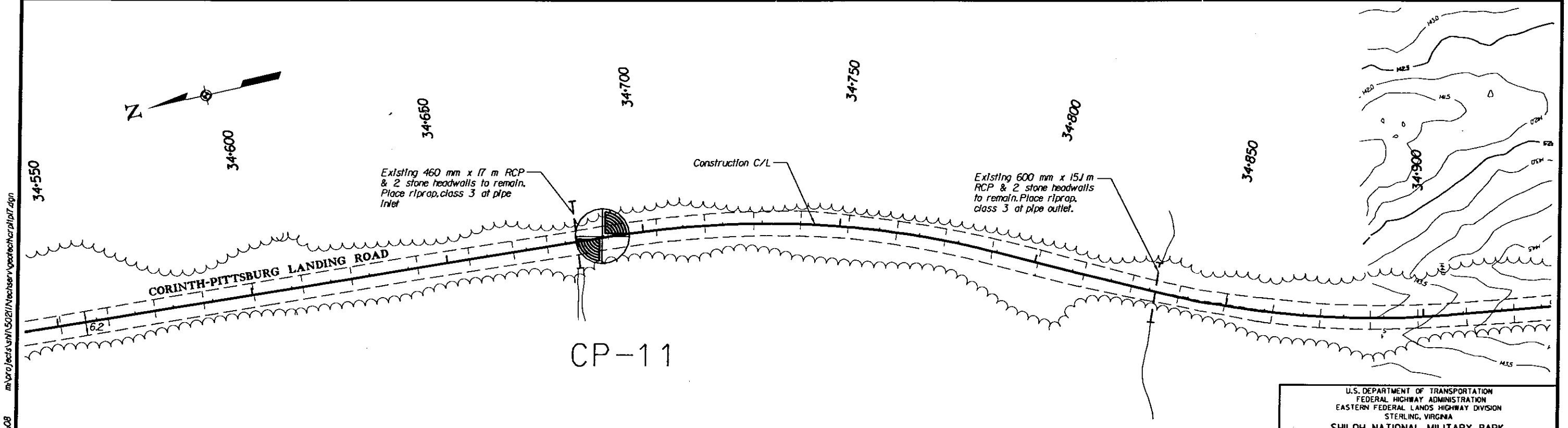

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STERLING, VIRGINIA

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BORING LOCATIONS PLAN

CORINTH-PITTSBURG LANDING ROAD
34+200 to 34+900

0 10 20
SCALE IN METERS

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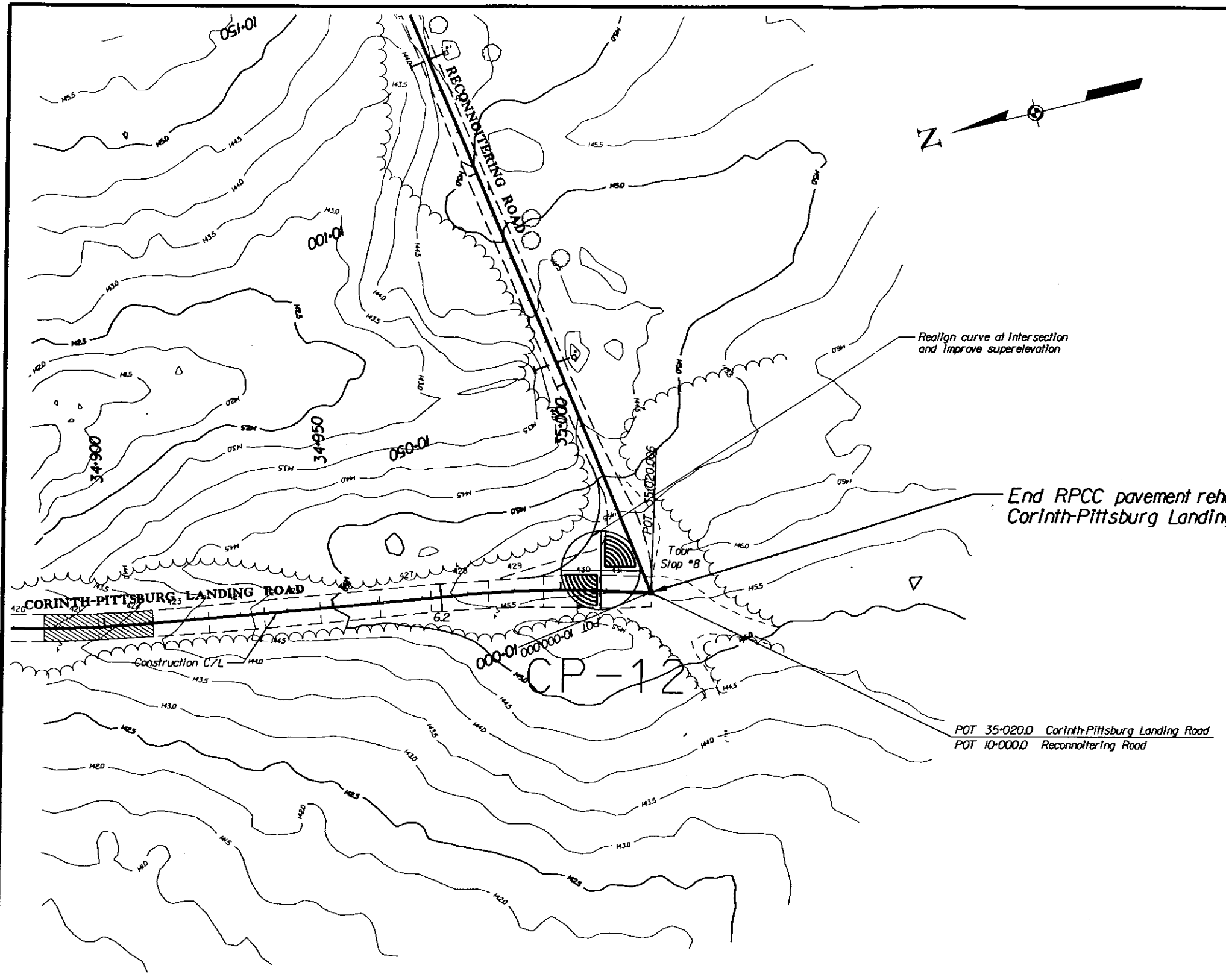

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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

SHILOH NATIONAL MILITARY PARK

BORING LOCATIONS PLAN

CORINTH-PITTSBURG LANDING ROAD
34+900 to 35+020

0 10 20
SCALE IN METERS

NPS NO.	REG	STATE	PROJECT	SHEET NO.
000 / 00000	SE	TN	PRA-SHIL 502(11), ETC.	

N

End realignment
McClernand Road 40+400.0

POT 40+403.0 McClernand Road
POT 50+031.8 Sherman Road

SHERMAN ROAD

PT 50+168.74

PC 50+086.449

PT 40+389.387

N 74° 21' 40.08" W

Curve- MCLRND-3

PC 40+313.892

N 26° 10' 09" W

MS-2

MS-1

Widen turnout to accommodate 2 cars

Construction C/L

Existing 480 mm x 5.2 m clay pipes to remain.

End overlay/Begin realignment
McClernand Road 40+302.0

CORINTH-PITTSBURG LANDING ROAD

McCLERNAND ROAD

Begin 70 mm HACP class B, grading D overlay
McClernand Road 40+004.0

POT 40+000.0

POT 40+000.0 McClernand Road
POC 32+528.0 Corinth-Pittsburg Landing Road

Curve- MCLRND-3
Δ = 48° 03' 41.16" (LT)
R= 90.000 m
T= 40.128 m
L= 75.495 m

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STERLING, VIRGINIA

SHILOH NATIONAL MILITARY PARK

BORING LOCATIONS PLAN

McCLERNAND ROAD
40+000 to 40+403

0 10 20
SCALE IN METERS

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
000 / 00000	SE	TN	PRA-SHIL 502(1), ETC.	

POT 50+031.8 Sherman Road
POT 40+403.0 McClernand Road

Begin 70 mm HACP, class B, grading D overlay 50+020.0

MS-3

MS-4

MS-5

SHERMAN ROAD

McCLERNAND ROAD

CORINTH-PITTSBURG LANDING ROAD

HAMBURG-PURDY ROAD

Construction C/L

PT 50+168.741

PC 50+088.449

PT 40+389.387

PC 40+313.893

50-085 to 50-150 +/- Rt.
Construct 2-bus turnout

Curve+ SHERMN-2

Curve+ SHERMN-2
Δ = 30° 40' 08.76" (RT)
R= 150.000 m
T= 41.133 m
L= 80.292 m

End overlay/Begin realignment
Sherman Road 50+080.0

Remove existing 460 mm x 15.1 m CMP & 2 stone headwalls. Install 600 mm x 16 m PC and 2 stone headwalls.

Existing 305 mm x 6.1 m RCP to remain

Convert existing paved road to paved trail.

50+284 to 50+325 +/- Lt.
Construct 2-car turnout

End realignment/Begin overlay
Sherman Road 50+350.0

End 70 mm HACP, class B, grading D overlay
Sherman Road 50+418.0.0

POT 50+480.7 Sherman Road
POC 33+041.8 Corinth-Pittsburg Landing Road

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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

SHILOH NATIONAL MILITARY PARK

BORING LOCATION PLAN

SHERMAN ROAD
50+000 to 50+480

SCALE IN METERS

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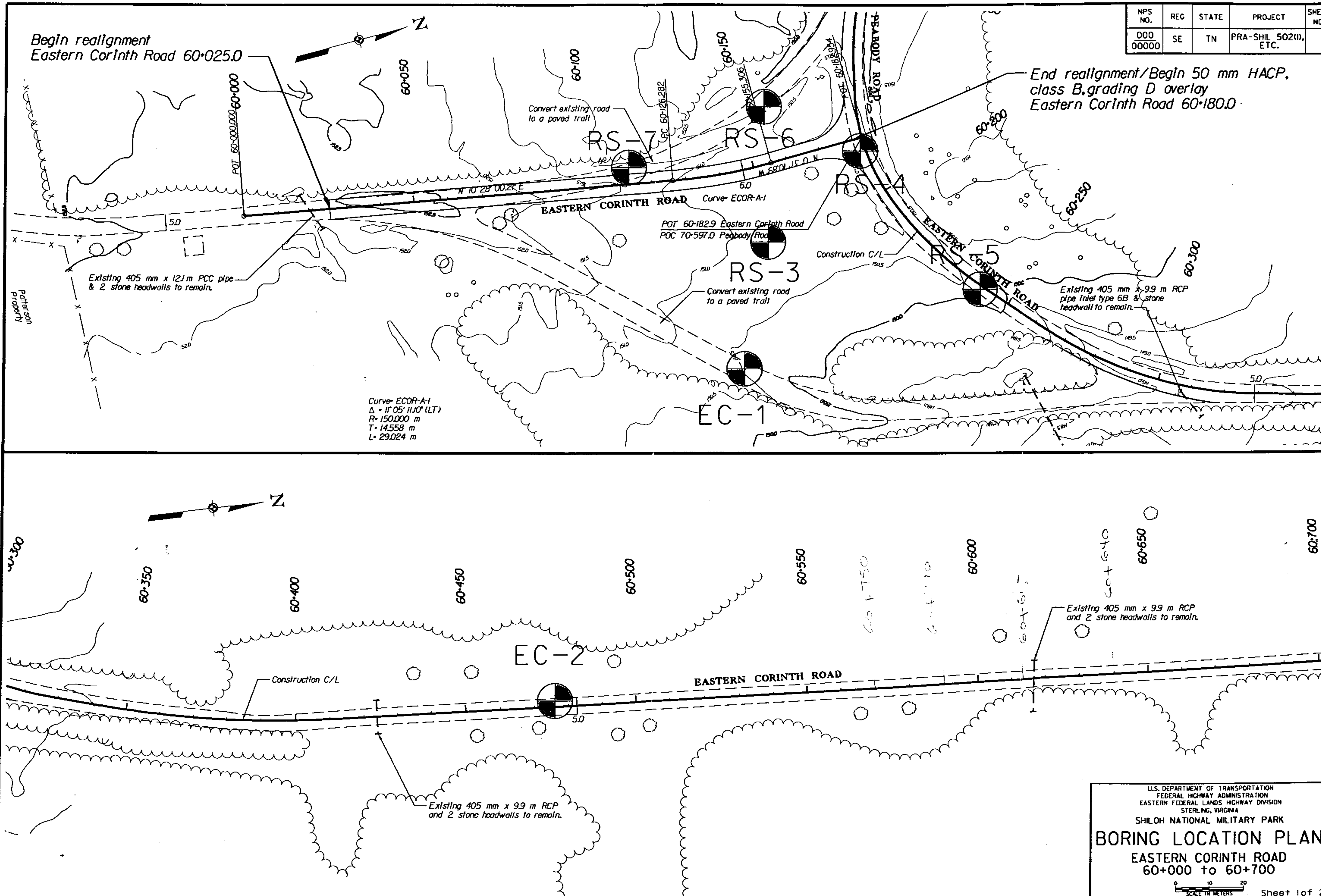

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STERLING, VIRGINIA

SHILOH NATIONAL MILITARY PARK

BORING LOCATION PLAN

EASTERN CORINTH ROAD
60+000 to 60+700

0 10 20 SCALE IN METERS

Sheet 1of 2

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
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N

End 50 mm HACP, class B, grading D overlay
Eastern Corinth Road 61+014.7

60+700

60+750

60+780

60+800

60+850

60+900

60+950

61+000

POT 61+014.744

Existing 360 mm x 23 m RCP and 2 stone headwalls to remain.

Construction C/L

EASTERN CORINTH ROAD

5.0

EC-3

Existing 405 mm x 43 m RCP, 2 inlets, type 6B and end section to remain.

HAMBURG-PURDY ROAD

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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

SHILOH NATIONAL MILITARY PARK

BORING LOCATION PLAN

EASTERN CORINTH ROAD
60+700 to 61+014

0 10 20
SCALE IN METERS

Sheet 2 of 2

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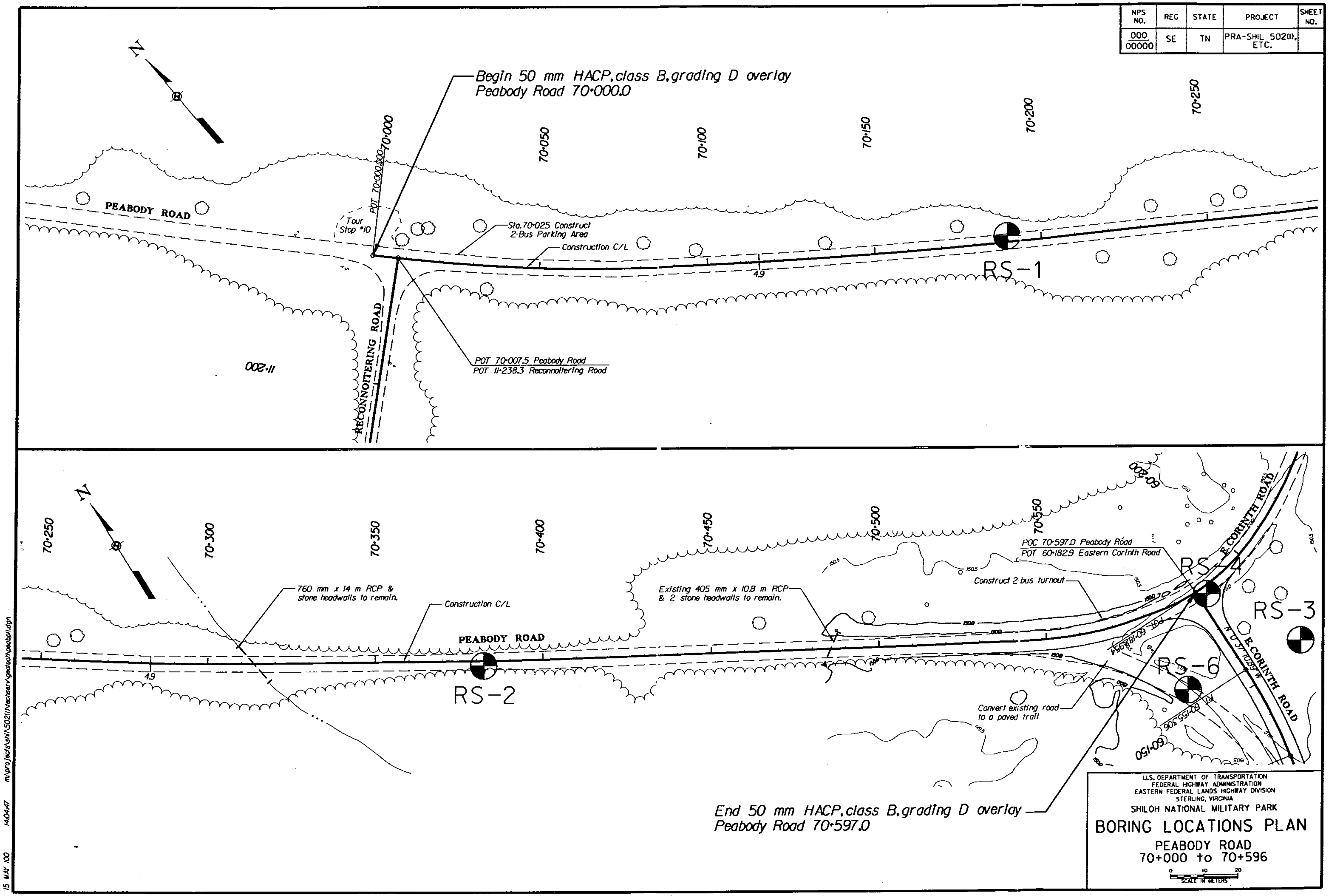

NPS NO. | REG | STATE | PROJECT | SHEET NO.
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Begin 50 mm HACP, class B, grading D overlay
Peabody Road 70+000.0
70+000
70+050
70+100
70+150
70+200
70+250
PEABODY ROAD
Tour Stop #10
POT 70+000.000
Sta. 70+025 Construct 2-Bus Parking Area
Construction C/L
RS-1
RECONNOITERING ROAD
POT 70+007.5 Peabody Road
POT 11+238.3 Reconnoitering Road
11+200
70+300
70+350
70+400
70+450
70+500
70+550
760 mm x 14 m RCP & stone headwalls to remain.
Construction C/L
PEABODY ROAD
RS-2
Existing 405 mm x 10.8 m RCP & 2 stone headwalls to remain.
POC 70+597.0 Peabody Road
POT 60+182.9 Eastern Corinth Road
Construct 2 bus turnout
E. CORINTH ROAD
RS-4
RS-3
RS-6
Convert existing road to a paved trail
60+200
60+150
End 50 mm HACP, class B, grading D overlay
Peabody Road 70+597.0
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SHILOH NATIONAL MILITARY PARK
BORING LOCATIONS PLAN
PEABODY ROAD
70+000 to 70+596
SCALE IN METERS
15 MAY 100

NPS NO.	REG	STATE	PROJECT	SHEET NO.
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80+550
80+600
80+650
80+700
80+750
80+800
80+850
80+900

HS-2

HAMBURG-SAVANNAH ROAD

Construction C/L

6.2

Adjust radius at entrace to improve bus access

J-1

J-2

J-3

Tour Stop #12

Existing 910 mm x 12.1 m RCP & 2 stone headwalls to remain. Place riprap, class 3 at pipe inlet and outlet.

Existing stone curb to remain.

Construct 2-bus turnout

Existing 360 mm x 10.8 m RCP, stone headwall, and inlet to remain

Existing 600 mm x 9.9 m & 405 mm x 15.1 m RCP with 2 stone headwalls to remain. Place riprap, class 3 at pipe inlet.

N

Improve bus access to Peach Orchard PA by widening the north end and striping stalls.

PO-2

PO-1

BLOODY POND

81+000
81+050
81+100
81+150
81+200
81+250

BP-2

BP-1

Construction C/L

49

Existing 360 mm x 8.6 m RCP, inlet type 6B and stone headwall to remain. Place riprap, class 3 at pipe outlet.

Sta. 81+000 to 81+120 reconstruct asphalt pavement to proper cross slope.

HAMBURG-SAVANNAH ROAD

Existing 360 mm x 18.75 m RCP, inlet type 6B and stone headwall to remain.

Existing 360 mm x 17.5 m RCP & inlet type 6B to remain.

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SHILOH NATIONAL MILITARY PARK

BOINRG LOCATIONS PLAN

HAMBURG-SAVANNAH ROAD
80+550 to 81+250

SCALE IN METERS 0 10 20

Sheet 2 of 4

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
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N

81+250
81+300
81+350
81+400
81+450
81+500
81+550
81+600

Construction C/L

HS-5

HAMBURG-SAVANNAH ROAD

6.2

HS-6

Pave existing 2-car gravel turnout.

N

81+600
81+650
81+700
81+750
81+800
81+850
81+900
81+950

1+000

Construction C/L

POC 81+824.0 Hamburg-Savannah Road
POC 1+000.0 Brown's Landing Road

HAMBURG-SAVANNAH ROAD

6.2

BROWN'S LANDING ROAD

1+050

Existing 360 mm x 15.1 m RCP & 2 stone headwalls to remain. Place riprap, class 3 at pipe inlet.

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SHILOH NATIONAL MILITARY PARK

BORING LOCATION PLAN

HAMBURG-SAVANNAH ROAD
81+250 to 81+950

SCALE IN METERS 0 10 20

Sheet 3 of 4

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NPS NO.	REG	STATE	PROJECT	SHEET NO.
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N

T-1

T-2

T-3

T-4

TP-3

TP-4

HS-1

Obliterate existing loop road and turnaround

HAMBURG-SAVANNAH ROAD

TENT HOSPITAL ROAD

Construction C/L

Curve- TENT-1

Curve- TENT-2

Curve- TENT-3

PC 90+172.824

PT 90+115.027

N 60° 38' 52" W

N 87° 43' 49" E

PC 90+260.161

PT 90+286.613

N 31° 41' 49" E

PC 90+050.677

PT 90+329.806

90+150

90+100

90+050

90+000

80+000

80+050

80+100

80+150

80+200

80+250

80+300

002.06

8.2

6.2

POT 90+000.000

POT 80+000.000

POT 90+000.0 Tent Hospital Road

POT 80+044.5 Hamburg-Savannah Road

Curve- TENT-1
Δ = 92° 10' 31.16" (LT)
R= 40.000 m
T= 41.548 m
L= 64.351 m

Curve- TENT-2
Δ = 217° 39' 19.97" (LT)
R= 15.000 m
T= 43.992 m
L= 56.982 m

Curve- TENT-3
Δ = 37° 53' 27.33" (RT)
R= 40.000 m
T= 13.731 m
L= 26.453 m

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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

SHILOH NATIONAL MILITARY PARK

BORING LOCATIONS PLAN

TENT HOSPITAL SITE
90+000 to 90+357

0 10 20
SCALE IN METERS

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APPENDIX C - Boring Logs

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 1⅜" I.D., 2" O.D., except where noted
ST: Shelby Tube - 2" O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible even after several days, and additional information on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 3"
Gravel	
Coarse	1" to 3"
Medium	⅜" to 1"
Fine	No. 10 to ⅜"
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a No. 10 sieve (pinhead size).
Silt	1. Lumps are easily crumbled when air-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (⅛" in diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term - "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE": 10% or less
5. Minor Grain Size(s)
6. Other (moisture content - dry, moist, wet; plasticity,etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRASHIL 502(1)

Boring Location: RECONNOITERING ROAD

Boring No. R-1 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From --To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 / 0.91	0.47	4.5		5		
						10		
						14		
						15	0.91	
J-2	SS	0.91 / 1.52	0.61	4.5+		8		
						12		
						16		
						20	1.52	

DESCRIPTION

0.03 AC

0.07 AGG. BASE

Very stiff, reddish brown, CLAY, some silt, trace fine sand (moist)

DITTO

BOTT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRNSHL 502(1)

Boring Location: RECONNOITERING ROAD

Boring No. R-2 | Date: 8-9-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: H.S. | Size: 6 3/4"

Boring Began: 8-9-96 | Completed: 8-9-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: HUGHES, KINGSLEY

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Tarvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0-31	
J-1	SS	0.31 -0.91	0.38	4.5		5 4 5 10		
J-2	SS	0.91 -1.52	0.61	4.5		6 11 18 18		

DESCRIPTION

AC

AGG. BASE

Medium stiff, brown, CLAY, some silt, trace chert, (moist)

HARD, red, CLAY, some silt; trace sand, (moist)

BOT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location:

Boring No. R-3 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Water Level			
Time			
Date			

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY, HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.51	4.5		3, 7, 10, 13	0.91	
J-2	SS	0.91 / 1.52	0.61	4.5		8, 10, 12, 14	1.52	

DESCRIPTION

0.08m AC
0.06m AGG. BASE

Very stiff, reddish brown, CLAY, some silt, trace fine sand (moist)

DETTO

BOT @ 1.52m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: RECONNOITERING ROAD (PRIDGE)

Boring No. BB-1 | Date: 8-13-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type:

Casing Used: HSA | Size: 6 3/4" | N/A

Boring Began: | Completed: 8-13-96

Ground Elevation: | Weather: CLOUDY

Inspector: THORNTON | Operator: KINGSLEY, HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
J-1	SS	0.0 / 0.61	0.28	—		3, 4, 4, 1	0.61	
J-2	SS	0.61 / 1.22	0.22	—		2, 2, 2, 2	1.22	
J-3	SS	1.22 / 1.52	0.08	—		6, 51	1.52	
							1.93	
J-4	SS	1.93 / 2.54	0.25	—		5, 14, 16, 17	2.54	
J-5	SS	2.54 / 3.15	0.36	2.0		2, 3, 3, 4	3.15	
J-6	SS	3.15 / 3.76	0.50	1.5		1, 1, 1, 2	3.76	
J-7	SS	3.76 / 4.37	0.61	1.75		1, 1, 2, 2	4.37	
J-8	SS	4.37 / 4.98	0.61	2.75		1, 2, 4, 4	4.98	

DESCRIPTION

Very Loose to medium dense, brown, SAND, little to some, trace Silt (Damp to moist)

- Encountered trace WEATHERED ROCK FRAGMENTS

Very soft to medium stiff, brown, gray, CLAY, some silt, trace fine sand (moist to wet)

BOTT @ 4.98 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1) BRIDGE
Boring Location: RECONNOITERING ROAD
Boring No. BB-2 | Date: 8-12-96 | Sheet 1 of 1
Type of Boring: SS | Drilling Mud Type: N/A
Casing Used: HSA | Size: 6 3/4"
Water Level | Time | Date
Boring Began: 8-12-96 | Completed: 8-12-96
Ground Elevation: | Weather: CLOUDY
Inspector: THORNTON | Operator: KINGSLEY/HUGHES
Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
J-1	SS	0.0 / 0.61	0.35	1.5		1 1 1 2	0.0 0.61		very loose to loose, brown, fine to coarse SAND, little to some silt, trace clay (moist
J-2	SS	0.61 / 1.22	0.15	—		1 2 3 4	1.22		
J-3	SS	1.22 / 1.93	0.40	0.75		1 1 5 7	1.93		
J-4	SS	1.93 / 2.54	0.50	2.0		2 26 39 39	2.54		very dense, brown, f-c SAND, some silt, little weathered rock fragments (moist
J-5	SS	2.54 / 3.15	0.28	2.5		2 1 2 5	3.15		very loose to medium dense, brown & gray, f-c SAND, little to some silt, trace clay (moist)
J-6	SS	3.15 / 3.76	0.61	—		1 1 6 6			
J-7	SS	3.76 / 4.37	0.61	—		1 5 6 3	4.37		
J-8	SS	4.37 / 4.98	0.61	1.0		3 11 12 16	4.98		
									BOT @ 4.98 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: VISITORS CENTER & CEMETERY PARKING AREAS

Boring No. VC-1 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORTON | Operator: HUGHES, KINGSLEY

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.56	4.0		3 6		
						6 8	0.91	
J-2	SS	0.91 / 1.52	0.60	4.5+		3 8		
						11 15	1.52	

DESCRIPTION

0.10 — AC

0.14 — AGG. BASE

Stiff to very stiff, brown, CLAY, little to some sand (moist)

BOHT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

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   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring No. VC-2 | Date: 8-6-96 | Sheet 1 of 1

Boring Location: VISITOR CENTER & CEMETERY PARKING AREAS

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Water Level			
Time			
Date			

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORTON | Operator: HUGHES, KINGSLEY

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.51	4.5+		3 5 9 17	0.91	
J-2	SS	0.91 / 1.52	0.59	4.5+		7 13 17 22	1.52	

DESCRIPTION

0.08 AC

0.22 AGG. BASE

Stiff to very stiff, red, CLAY, some f-c sand (moist)

BOTT @ 1.52 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring No. VC-3 | Date: 8-6-96 | Sheet 1 of 1

Boring Location: VISITORS CENTER & CEMETERY PARKING AREAS

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Water Level

Time

Date

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORTON | Operator: HUGHES, KINGSLEY

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.50	1.0		1 2 3 3	0.91	
J-2	SS	0.91 / 1.52	0.61	1.5		6 4 3 5	1.62	

DESCRIPTION

0.09 AC

0.09 AGG. BASE

Soft to medium stiff, Brown, red CLAY, some f-c sand (moist)

BOTT @ 1.52 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: VISITOR CENTER & CEMETERY PARKING AREAS

Boring No. VC-4 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Water Level | Time | Date

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORTON | Operator: HUGHES, KINGSLEY

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.50	1.75		2, 3		
						3, 5	0.91	
J-2	SS	0.91 / 1.52	0.53	2.0		2, 3		
						3, 4	1.52	

DESCRIPTION

0.07 AC

0.15 AGG. BASE

Soft to medium stiff, brown, red CLAY, some f-c sand (moist)

BMT @ 1.52 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: VISITORS CENTER & CEMETERY PARKING AREAS

Boring No. VC-5 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Water Level | Time | Date

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORTON | Operator: HUGHES, KINGSLEY

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.61	3.0		1 4 7 12	0.91	
J-2	SS	0.91 / 1.52	0.61	4.0		4 6 12 14	1.52	

DESCRIPTION

0.10 m - AC

0.11 m - AGG. BASE

Stiff to very stiff, reddish brown, CLAY, some sand, trace silt (moist).

BOT @ 1.52 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: VISITOR CENTER & CEMETERY PARKING AREAS

Boring No. VC-6 | Date: 8-9-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: | Size: 4 1/2

Water Level | Time | Date

Boring Began: 8-9-96 | Completed: 8-9-96

Ground Elevation: | Weather: CLEAR

Inspector: THORTON | Operator: HUGHES, KINGSLEY

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.61	4.5+		3 5		
						8 12	0.91	
J-2	SS	0.91 / 1.52	0.61	4.5+		14 18		
						20 21	1.52	
J-3	SS	1.52 / 2.13	0.61	4.5+		4 8		
						11 15	2.13	

DESCRIPTION

AC

AGG. BASE

Stiff to hard, red, CLAY, some sand, trace silt (moist)

BOHT @ 2.13 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-1 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 / 0.91	0.61	4.25		2		
						6		
						8		
						12	0.91	
J-2	SS	0.91 / 1.52	0.61	4-5+		5		
						10		
						15		
						19	1.62	

DESCRIPTION

0.09m AC
0.04 AGG. BASE

stiff to very stiff, red, CLAY, trace to little sand (moist)

BOT @ 1.52 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-2 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Water Level | Time | Date

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.0		AC
							0.31		AGG. BASE
J-1	SS	0.31 - 0.91	0.61	4.5+		3 3			medium stiff to very stiff, red CLAY, trace to little Sand (moist)
						6 12	0.91		
J-2	SS	0.91 - 1.52	0.61	4.5+		6 9			
						14 20	1.52		

BAH @ 1.52

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-3 | Date: 8-9-96 | Sheet 1 of 1

Type of Boring: | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 6 3/4"

Water Level			
Time			
Date			

Boring Began: 8-9-96 | Completed: 8-9-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 / 0.91	0.50	4.0		3 / 3		
						6 / 11	0.91	
J-2	SS	0.91 / 1.52	0.61	4.5+		5 / 8		
						12 / 15	1.52	

DESCRIPTION

0.11 m AC

0.12 AGG. BASE

Medium stiff to very stiff, red CLAY, trace sand, trace silt, (moist)

BMT @ 1.52 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-4 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 / 0.91	0.49	2.5		12 1		
						1 2	0.91	
J-2	SS	0.91 / 1.52	0.61	2.5		2 4		
						6 11	1.52	

DESCRIPTION

0.09 AC
0.12 AGG. BASE

Soft to medium stiff, reddish brown, CLAY, trace Sand, trace Silt, (moist)

BOT @ 1.52 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-5 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Water Level			
Time			
Date			

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 - 0.91	0.61	3.5		4, 7, 8, 12	0.91	
J-2	SS	0.91 - 1.52	0.61	4.0		5, 8, 11, 17	1.52	

DESCRIPTION

0.09 AC
0.12 AGG. BASE

0.30 Gray, silty CLAY.
- Stiff to very stiff, Red, brown, CLAY, - trace Sand, trace Silt - (moist

BOAT @ 1.52 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-6 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 - 0.91						
							0.91	
J-2	SS	0.91 - 1.52						
							1.52	

DESCRIPTION

0.09 AC

0.12 AGG. BASE

Bottom of pavement core @ 0.21 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-7 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 - 0.91						
							0.91	
J-2	SS	0.91 - 1.52						
							1.52	

DESCRIPTION

0.07 AC

0.12 AGG. BASE

Bottom of pavement core @ 0.19 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-8 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 158mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 - 0.91						
							0.91	
J-2	SS	0.91 - 1.52						
							1.52	

DESCRIPTION

0.09 AC

0.07 AGG. BASE

Bottom of pavement core at 0.16 m

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING ROAD (I)

Boring No. PLI-9 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4½"

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY, HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level		
Time		
Date		

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
J-1	SS	0.0 / 0.61	0.33	—		6, 14, 5, 6	0.0, 0.6	
J-2	SS	0.61 / 1.22	0.61	4.0		1, 3, 9, 11	1.22	
J-3	SS	1.22 / 1.93	0.61	4.0		4, 6, 8, 10	1.93	

DESCRIPTION

Stiff to very stiff, brown, CLAY, trace sand, trace silt, (moist)

Bottom of hole @ 1.93 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING RD (I)

Boring No. PLI-10 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Water Level | Time | Date

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
J-1	SS	0.0 / 0.61	0.35	3.0		2 3 2 1	0.61	
J-2	SS	0.61 / 1.22	0.61	4.5		8 10 14 16	1.22	
J-3	SS	1.22 / 1.93	0.61	4.5		4 6 10 12	1.93	

DESCRIPTION

Soft to very stiff, reddish brown, CLAY, trace Sand, trace Silt (moist)

BH @ 1.93

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
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5. Minor Grain Size (s)
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For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location:

Boring No. PLI-11 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Water Level

Time

Date

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
J-1	SS	0.0 / 0.61	0.40	3.5		1 1. 4. 6	0.61	
J-2	SS	0.61 / 1.22	0.61	4.5		6 9. 12. 16	1.22	
J-3	SS	1.22 / 1.93	0.61	+ 4.5		4. 11 14 16	1.93	

DESCRIPTION

Soft to very stiff, brown, red, CLAY, trace f. Sand, trace Silt (moist)

BOH @ 1.93 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
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Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
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   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING RD (I)

Boring No. PLI-12 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level
Time
Date

Sample Number	Sample Type	Depth From -To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
						0-0		

DESCRIPTION

0-11 AC
0.07 m AGG BASE

Bottom of Coring depth at 0.18 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
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   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PITTSBURG LANDING RD (II)

Boring No. PL II-1 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4½"

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY, HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.31		0.09 AC 0.07 AGG. BASE
J-1	SS	0.31 0.91	0.46	4.5		4 4			Medium Stiff to Stiff, brown, red, CLAY, some Silt, trace Sand (moist)
						4 5	0.91		
J-2	SS	0.91 1.52	0.61	4.5+		4 5			
						8 10	1.52		

BMT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

ORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring No. PLH-2 | Date: 8-6-96 | Sheet 1 of 1

Boring Location: PITTSBURG LANDING RD II

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Water Level | Boring Began: | Completed:

Time | Ground Elevation: | Weather:

Date | Inspector: | Operator:

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.07		AC
							0.12		AGG BASE
J-1	SS	0.31 / 0.91	0.46	1.75		5, 4, 2, 2	0.91		Medium Stiff, red, CLAY, some Silt-, trace Sand (moist)
J-2	SS	0.91 / 1.52	0.41	2.5		2, 3, 5, 8	1.52		
									BOTT @ 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location:

Boring No. PLH-3	Date: 8-12-96
Sheet 1 of 1	
Type of Boring: SS	Drilling Mud Type: N/A
Casing Used: HSA	Size: 6 3/4"
Water Level	
Time	
Date	
Boring Began: 8-12-96	Completed: 8-12-96
Ground Elevation:	Weather: CLEAR
Inspector: THORNTON	Operator: KINGSLEY, HUGHES
Hammer Weight 63.5 +/- 1kg	

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.0		AC
							0.31		AGG BASE
S-1	SS	0.31 / 0.91	0.35	—		4, 4, 3, 5	0.91		very loose to loose, brown, silty SAND, trace chert- (moist- (FILL)
S-2	SS	0.91 / 1.52	0.17	—		1, 2, 1, 3	1.52		
S-3	SS	1.52 / 2.13	0.51	—		1, 2, 12, 11	2.13		, brown, silty Sand, moist-)
S-4	SS	2.13 / 2.74	0.56	2.75		4, 7, 4, 5	2.30 / 2.74		Medium stiff, red, CLAY, some silt, trace f. Sand (moist-)
S-5	SS	2.74 / 3.35	0.61	1.5		2, 3, 3, 3	3.35		BMT @ 3.35 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull..
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
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For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
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FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502 (1)

Boring Location: CORINTH - PITTSBURG RD

Boring No. CP-1 | Date: 8- -96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4 1/2"

Boring Began: 8- -96 | Completed: 8- -96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY, HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sam. No. Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.16	
J-1	SS	0.16 - 0.77	0.47	2.0		3 3 4 9	0.77	
J-2	SS	0.77 - 1.38	0.61	4.25		6 12 16 18	1.38	

DESCRIPTION

0.16m RPCC

Medium stiff to very stiff, brown, CLAY, some silt, trace f. Sand (moist)

BHT @ 1.38m

GENERAL NOTES

Drilling and Sampling Symbols

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PA: Power Auger Sample

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VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
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Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
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Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH_PITTSBURG RD

Boring No. CP_3 | Date: 8-13-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4 1/2"

Water Level

Time

Date

Boring Began: 8-13-96 | Completed: 8-13-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.16		0.16 m RPCC
-1	SS	0.16 / 0.74	0.53	4.0		5 5 7 5	0.77		Stiff to very stiff, brown, CLAY, some silt, trace f. Sand (moist)
-2	SS	0.77 / 1.37	0.61	4.0		4 9 10 11	1.37		
									BHT @ 1.37 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

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VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

ORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH_PITTSBURG RD

Boring No. CP-2	Date: 8-13-96	Sheet 1 of 1
Type of Boring: SS		Drilling Mud Type: N/A
Casing Used: CORE	Size: 4 1/2"	
Boring Began: 8-13-96	Completed: 8-13-96	
Ground Elevation:	Weather: CLEAR	
Inspector: THORNTON	Operator: KINGSLEY/HUGHES	
Hammer Weight 63.5 +/- 1kg		

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.13	
-1	SS	0.13	0.54	2.0		2		
		0.74				3		
						3		
						5	0.74	
-2	SS	0.74	0.61	4.0		6		
		1.35				11		
						12		
						17	1.35	

DESCRIPTION

0.13 m RPCC

Medium Stiff to very Stiff, brown, CLAY, little Silt, trace Sand (moist)

BMT @ 1.35 m

GENERAL NOTES

Drilling and Sampling Symbols

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Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

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(10% - 40%) (1% - 10%)

ORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH_PITTSBURG RD

Boring No. CP_4	Date: 8-13-96	Sheet 1 of 1	
Type of Boring: SS		Drilling Mud Type: N/A	
Casing Used: CORE	Size: 4½"		
Boring Began: 8-13-96	Completed: 8-13-96		
Ground Elevation:	Weather: CLEAR		
Inspector: THORNTON	Operator: KINGSLEY/HUGHES		
Hammer Weight 63.5 +/- 1kg			

Water Level			
Time			
Date			

Sample No. / Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.13	
1	SS	0.13 - 0.74	0.54	3.0		3 4 3 6	0.74	
-2	SS	0.74 - 1.35	0.61	4.0		6 12 17 18	1.35	

DESCRIPTION

0.13m RPCC

Medium stiff, to very stiff, brown, CLAY, some silt, trace f. sand (moist)

BHT @ 1.35m

GENERAL NOTES

Drilling and Sampling Symbols

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FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring No. CP-5 | Date: 8-13-96 | Sheet 1 of 1

Boring Location: CORINTH-PITTSBURG RD

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4½"

Water Level

Time

Date

Boring Began: 8-13-96 | Completed: 8-13-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.13		0.13 m RPCC
1	SS	0.13 / 0.74	0.30	4.0		5 6 6 7	0.74		STIFF to very stiff, tan/brown, CLAY, some silt, trace f. sand (moist)
-2	SS	0.74 / 1.35	0.47	4.0		5 7 10 13	1.35		
									BOT @ 1.35 m

GENERAL NOTES

Drilling and Sampling Symbols

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FORM: FHWA-IS-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH_ PITTSBURG RD

Boring No. CP_ 6 | Date: 8-13-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4 1/2"

Boring Began: 8-13-96 | Completed: 8-13-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.12		0.12 m RPCC
-1	SS	0.12 / 0.73	0.36	1.0		5 5 11 10	0.73		Very stiff, Brown, red, CLAY, some silt, trace f sand (moist)
-2	SS	0.73 / 1.34	0.54	4.0		4 7 10 11	1.34		
									BMTG 1.34 m

GENERAL NOTES

Drilling and Sampling Symbols

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BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH_PITTSBURG RD

Boring No. CP-7 | Date: 8-14-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4 1/2"

Boring Began: 8-14-96 | Completed: 8-14-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level				
Time				
Date				

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.07 m		AC
							0.19		0.12 m RPCC
-1	SS	0.19 / 0.80	0.40	3.0		3 4 5 3	0.80		very soft to stiff, gray, SILT, some clay, some f-m sand (moist- to wet
-2	SS	0.80 / 1.41	0.55	2.0		1 1 1 1	1.41		
-3	SS	1.41 / 2.02	0.40	—		1 1 1 1	2.02		
-4	SS	2.02 / 2.63	0.50	—		WOH/0.61	2.63		very soft to medium stiff, gray, , some f-m sand, some clay (wet)
-5	SS	2.63 / 3.24	0.45	—		1 2 3 5	3.24		
									BMT @ 3.24m

GENERAL NOTES

Drilling and Sampling Symbols

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FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring No. CP-8 | Date: 8- -96 | Sheet 1 of 1

Boring Location: CORINTH_PITTSBURG RD

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4½"

Water Level

Time

Date

Boring Began: 8- -96 | Completed: 8- -96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.03		0.03 — AC
							0.18		0.15 RPCC
-1	SS	0.19 / 0.80	0.23	—		4, 3			Loose, brown, silty, f-c SAND, trace to some clay (moist)
						3, 4	0.79		
-2	SS	0.80 / 1.41	0.40	2.0		3, 3			
						6, 3	1.40		
-3	SS	1.41 / 2.02	0.29	1.0		1, 2			very loose to loose, brown, silty SAND, some clay (moist)
						1, 1	2.01		
-4	SS	2.02 / 2.63	0.48	3.5		1, 1			
						2, 3	2.62		
-5	SS	2.63 / 3.24	0.61	3.0		2, 3			
						7, 6	3.23		BMNT @ 3.23 m

GENERAL NOTES

Drilling and Sampling Symbols

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FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH_PITTSBURG RD

Boring No. CP-9 | Date: 8-14-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4 1/2"

Water Level

Time

Date

Boring Began: 8-14-96 | Completed: 8-14-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.0		0.09m AC / 0.13 RPCC
							0.22		
-1	SS	0.22 / 0.83	0.46	2.0		4, 9, 11, 4	0.83		very loose to medium dense, gray, silty, f-c SAND, some clay (moist)
-2	SS	0.83 / 1.44	0.40	1.0		2, 1, 1, 1	1.44		
-3	SS	1.44 / 2.05	—	—		WOH	2.05		very loose, gray, silty, f-c SAND, some clay (moist to wet)
-4	SS	2.05 / 2.66	—	—		WOH	2.66		
-5	SS	2.66 / 3.27	0.61	—		WOH, 2, 5	3.27		
									BOH at 3.27m

GENERAL NOTES

Drilling and Sampling Symbols

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FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH_PITTSBURG RD

Boring No. CP-10	Date: 8-13-96	Sheet 1 of 1	
Type of Boring: SS		Drilling Mud Type: N/A	
Casing Used: CORE	Size: 4 1/2"		
Boring Began: 8-13-96	Completed: 8-13-96		
Ground Elevation:	Weather: CLEAR		
Inspector: THORNTON	Operator: KINGSLEY/HUGHES		
Hammer Weight 63.5 +/- 1kg			

Water Level
Time
Date

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.0		0.13 m RPCC
							0.13		
1	SS	0.13	0.48	2.0		1			Medium stiff to very stiff, brown, CLAY, some silt, trace Sand (moist)
		0.74				3			
						6			
						8	0.74		
-2	SS	0.74	0.61	3.0		5			
		1.35				10			
						14			
						16	1.35		
									BOMT @ 1.35 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH - PITTSBURG RD

Boring No. CP-11 | Date: 8-13-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4 1/2"

Boring Began: 8-13-96 | Completed: 8-13-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.13		0.13 m RPCC
1-1	SS	0.13 / 0.74	0.21	—		3, 4, 6, 2			Very loose to loose, brown, clayey, f-m SAND, some silt (moist)
1-2	SS	0.74 / 1.35	0.04	—		1, 2, 2, 1			
									BHT @ 1.35 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: CORINTH_PITTSBURG RD

Boring No. CP-12 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: CORE | Size: 4 1/2"

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level | | | |
Time | | | |
Date | | | |

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 158mm Increments	Depth (Meters)	Elevation (Meters)
						1		
						1		
	SS	0.31		1.5		2		
		0.61				3	0.61	
						5		
						9.		
-2	SS	0.61		4.5		12.		
		1.22				18	1.22	
						4		
						9.		
-3	SS	1.22		3.5		12.		
		1.93				16	1.93	

DESCRIPTION

very loose to medium dense, brown, clayey, f-m SAND, some silt, (moist)

BHT @ 1.93 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA 5 HIL 5020(1)

Boring Location: McClernand Road

Boring No. MS-1 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2"

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level

Time

Date

Sample No. / Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.31		0-0.8 AC
S-1	SS	0.31 / 0.91	0.51	1.75		1 2 2 5	0.91		Soft to very dense, brown, CLAY, some silt, trace sand (moist)
S-2	SS	0.91 / 1.52	0.61	4.0		4 7 9 11	1.52		
									BMT ③ 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: MCCLERNAND ROAD

Boring No. MS-2	Date: 8-6-96	Sheet 1 of 1	
Type of Boring: SS		Drilling Mud Type: N/A	
Casing Used: SOLID	Size: 4 1/2"		
Boring Began: 8-6-96	Completed: 8-6-96		
Ground Elevation:	Weather: CLEAR		
Inspector: THORNTON	Operator: KINGSLEY/HUGHES		
Hammer Weight 63.5 +/- 1kg			

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.31		0.03 AC
S-1	SS	0.31 0.91	0.46	2.0		4 6 4 4	0.91		very soft to medium stiff, brown, CLAY, some silt, trace f. sand (moist).
S-2	SS	0.91 1.52	0.54	1.0		2 1 1 1	1.52		BHT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

ORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: MCCLERNAND ROAD

Boring No. MS-3 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level

Time

Date

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.31		0.03 AC
-1	SS	0.31 / 0.91	0.55	4.0		3 3 6 8	0.91		Medium Stiff to very Stiff, brown, CLAY, some Silt, trace f. Sand (moist)
-2	SS	0.91 / 1.52	0.61	+ 4.5		3 8 12 14	1.52		
									BHT @ 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: MCCLERNAND ROAD

Boring No. MS-4 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4½"

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather:

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level | Time | Date

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
S-1	SS	0.31 / 0.91	0.47	2.0		1 2 3 5	0.91	
S-2	SS	0.91 / 1.52	0.61	4.5+		5 10 12 14	1.52	

DESCRIPTION

Soft to very stiff, brown, CLAY, some silt, trace f-Sand (moist)

BHT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

ORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 602(1)

Boring Location: MCCLERNAND ROAD

Boring No. MS-5 | Date: 8-6-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4 1/2

Boring Began: 8-6-96 | Completed: 8-6-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level
Time
Date

Sample Number	Sample Type	Depth From -To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
S-1	SS	0.31 / 0.91	0.40	2.0		4		
						2		
						1		
						4	0.91	
S-2	SS	0.91 / 1.52	0.61	4.5		3		
						6		
						9		
						11	1.52	

DESCRIPTION

0.06m AC

very soft to stiff, brown, CLAY, some silt, trace f. sand (moist)

BMT @ 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

ORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: NEW ENTRANCE ROAD

Boring No. E-1 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 4½"

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
S-1	SS	0.31 / 0.91	0.61	1.0		1 1 3 6		
S-2	SS	0.91 / 1.52	0.52	+4.5		2 6 9 13		

DESCRIPTION

0.03 m AC
0.13 A.G.G. BASE

Soft to stiff, reddish brown, CLAY, some silt, trace f. Sand (moist)

BMT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: NEW ENTRANCE RD

Boring No. E-2 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112.5 mm

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather:

Inspector: | Operator:

Hammer Weight 63.5 +/- 1kg

Water Level | | | |
Time | | | |
Date | | | |

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
							0.04 m		0.04 m AC
							0.31		0.04 AGG. BASE
J-1	SS	0.31 / 0.91	0.61	0.5		1 1 1 4	0.91		very ~~soft~~ to stiff, reddish brown, CLAY, trace silt, trace fine sand (moist-)
J-2	SS	0.91 / 1.52	0.61	4.25		1 6 9 12	1.52		
									~~BHT~~ BOT at 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

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Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

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For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: SERVICE ROAD - BETWEEN PLI & EC.

Boring No. S-1 | Date: 8-1-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112.5 mm

Boring Began: 8-1-96 | Completed: 8-1-96

Ground Elevation: | Weather:

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0-31	
S-1	SS	0.31 / 0.91	0.55	4+ / 4.5		10 / 16 / 16 / 21	0.91	
S-2	SS	0.91 / 1.52	0.61	4.5		7 / 18 / 21 / 22	1.52	

DESCRIPTION

0.09m AC
0.10 AGG. BASE

Hard, brown, CLAY, little silt, trace fine sand (moist)

BOTTOM @ 1.52m

GENERAL NOTES

Drilling and Sampling Symbols

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PA: Power Auger Sample

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VISUAL METHODS FOR SOILS CLASSIFICATION

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Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
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5. Minor Grain Size (s)
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For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

ORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PEA SHIL 502(1)

Boring Location: PEABODY ROAD (RHEA SPRINGS)

Boring No. RS-1 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112-5 mm

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSELY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level				
Time				
Date				

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
1-1	S	0.31 / 0.91	0.51	2.5		4 6 10 14	0.91	
1-2	S	0.91 / 1.52	0.42	2.0		1 2 2 2	1.52	

DESCRIPTION

0.08 AC

Soft to very stiff, brown, CLAY, trace to little silt, trace fine sand (moist).

BOHTO 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
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Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
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5. Minor Grain Size (s)
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For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PEABODY ROAD (RHEA SPRINGS)

Boring No. RS-2 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112-5 mm

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level / Time / Date

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
S-1	SS	0.31 - 0.91	0.38	1.75		4 3		
						3 5	0.91	
S-2	SS	0.91 - 1.52	0.61	4.0		3 5		
						8 9	1.52	

DESCRIPTION

0-12m AC

Medium stiff to stiff, brown, CLAY, some silt, trace fine sand (moist)

BMT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
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Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PEABODY ROAD (RHEA SPRINGS)

Water Level			
Time			
Date			

Boring No. RS-3 | Date: 8-9-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: HSA | Size: 1-¼-5

Boring Began: 8-9-96 | Completed: 8-9-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY, HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
J-1	SS	0.0 / 0.61	0.4	2.5		1 1		
						2 2	0.61	
J-2	SS	0.61 / 1.22	0.61	4.5		3 6		
						9 11	1.22	
J-3	SS	1.22 / 1.83	0.61	4.5		3 8		
						10 15	1.83	

DESCRIPTION

very soft to very stiff, brown, CLAY, trace silt, trace fine sand (moist)

BHT @ 1.83m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
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PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

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For example:

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DRM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: DRA SHIL 502(1)

Boring Location: PEABODY ROAD (RHEA SPRINGS)

Boring No. RS-4 | Date: | Sheet of

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 11Z-5 mm

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
								0.0

DESCRIPTION

0.13 m AC

0.14 m AGG. BASE

GENERAL NOTES

Drilling and Sampling Symbols

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PA: Power Auger Sample

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↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHL-502(1)

Boring Location: PEABODY ROAD (RHEA SPRINGS)

Boring No. RS-5	Date: 8-7-96	Sheet 1 of 1
Type of Boring: SS		Drilling Mud Type: N/A
Casing Used: SOLID	Size: HZ-5	
Boring Began:	Completed:	
Ground Elevation: THORNTON	Weather: KINGSLEY / MUGGY	
Inspector:	Operator:	
Hammer Weight 63.5 +/- 1kg		

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From --To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)

DESCRIPTION

0.16m — AC
0.14 — AGG. BASE

GENERAL NOTES

Drilling and Sampling Symbols

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PA: Power Auger Sample

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For example:

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Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PEABODY ROAD (RHEA SPRINGS)

Boring No. RS-6	Date: 8-7-96	Sheet 1 of 1
Type of Boring: SS		Drilling Mud Type: N/A
Casing Used: SOLID	Size: 11Z-5	
Boring Began: 8-7-96	Completed: 8-7-96	
Ground Elevation:	Weather: CLEAR	
Inspector: THORNTON	Operator: KINGSLEY/HUGHES	
Hammer Weight 63.5 +/- 1kg		

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Tarvane Kg/cm2	No. of Blows on Sampler for 158mm Increments	Depth (Meters)	Elevation (Meters)

DESCRIPTION

0.07 M AC

WEATHERED CHERT FRAGMENTS BENEATH AC

GENERAL NOTES

Drilling and Sampling Symbols

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PA: Power Auger Sample

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Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
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   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

ORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: EASTERN CORINTH ROAD (I)

Boring No. EC-1 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 11Z-5

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sam. & Number	Sample Type	Depth From --To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
J-1	SS	0.31 / 0.91	0-61	4.0		3 5 4 5		
J-2	SS	0.91 / 1.52	0-61	3.0		3 8 4 9	1.52	

DESCRIPTION

0-11 m — AC
0.14 m — AGG. BASE

Medium Stiff to Stiff, brown, CLAY, trace silt, trace fine sand (moist)

BHT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: EASTERN CORINTH ROAD (I)

Boring No. EC-2 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type:

Casing Used: SOLID | Size: 112.5 mm

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
									0.09 / 0.10
J-1	SS	0.31 / 0.91	0.50	3.0		6 / 6 / 5 / 7			Medium Stiff to Stiff, brown, CLAY, trace Silt, trace fine Sand (moist)
J-2	SS	0.91 / 1.52	0.54	3.5		3 / 7 / 8 / 11	1.52		
									BOT @ 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring No. EC-3 | Date: 8-7-96 | Sheet 1 of 1

Boring Location: EASTERN CORINTH ROAD (I)

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112-5 mm

Water Level | Time | Date

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
J-1	SS	0.31 / 0.91	0.44	4.0		10 8 6 5	0.81	
J-2	SS	0.91 / 1.52	0.61	4.5+		5 7 9 9	1.52	

DESCRIPTION

0.10 m AC

0.13 AGG BASE

Stiff to very stiff, brown, CLAY, some silt, some fine sand (moist)

BOT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location:

Boring No. V-1 | Date: 8-12-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: HSA | Size: 171-mm

Boring Began: 8-12-96 | Completed: 8-12-96

Ground Elevation: | Weather: CLOUDY

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level

Time

Date

Sample Number	Sample Type	Depth From --To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
						1 / 1	0.0	
V-1	SS	0.0 / 0.61	0.35			2 / 3	0.61	
						4 / 6		
V-2	SS	0.61 / 1.22	0.47			10 / 14	1.22	
						5 / 4		
V-3	SS	1.22 / 1.93	0.61			28 / 30	1.93	
						10 / 30		
V-4	SS	1.93 / 2.30	0.47			51 /	2.30	
						22 / 55		
V-5	SS	2.34 / 2.95	0.61			/	2.95	

DESCRIPTION

Very soft to hard, brown / clayey silt, trace fine sand (moist)

Hard, brown, SILT, some clay, trace fine sand, trace chert fragments. (moist)

BMT @ 2.95 m

GENERAL NOTES

Drilling and Sampling Symbols

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ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: TENT HOSPITAL PARKING AREA

Boring No. T-1	Date: 8-7-96	Sheet 1 of 1
Type of Boring: SS		Drilling Mud Type: N/A
Casing Used: SOLID	Size: 112-5 mm	
Boring Began: 8-7-96		Completed: 8-7-96
Ground Elevation:		Weather: CLEAR
Inspector: THORNTON		Operator: KINGSLEY/HUGHES
Hammer Weight 63.5 +/- 1kg		

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)

DESCRIPTION

0.09 m AC
NO AGGREGATE BASE ENCOUNTERED

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
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Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
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   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: TENT HOSPITAL PARKING AREA

Boring No. T-2 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: NZ - 5 mm

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From --To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)

DESCRIPTION

0-09m AC

NO AGG. BASE ENCOUNTERED

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
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Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
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   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. J-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: TENT HOSPITAL PARKING AREA

Boring No. T-3 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 11Z-5

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level									
Time									
Date									

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
J-1	SS	0.0 / 0.61	0.47	1.75		1 1 2 4	0.0 0.61		very soft, brown, CLAY, some silt, trace fine sand (moist)
J-2	SS	0.61 / 1.22	0.56	3.0		4 11 14 14	1.22		Very ~~stiff~~, brown, CLAY, some silt, trace fine sand (moist)
J-3	SS	1.22 / 1.93	0.61	4.0		3 12 14 16	1.93		
									BOT at 1.93 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

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VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
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Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
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Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: JOHNSTON MEMORIAL

Boring No. J-3 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 11/2-in

Water Level			
Time			
Date			

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)

DESCRIPTION

0-0.07 m AC

NO AGG. BASE WAS ENCOUNTERED

GENERAL NOTES

Drilling and Sampling Symbols

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PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
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Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
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Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 50241	Boring No. T-4	Date: 8-9-96	Sheet 1 of 1
Boring Location: NEW LOOP ROAD - DRILLED AT HAMBURG Purdy Rd	Type of Boring: SS		Drilling Mud Type: N/A
	Casing Used: HSA	Size: 171.5 mm	
Water Level	Boring Began: 8-9-96		Completed: 8-9-96
Time	Ground Elevation:		Weather: CLEAR
Date	Inspector: THORNTON		Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
J-1	SS	0.0 / 0.61	0.40	2.0		1, 2, 2, 3	0.0		Soft, brown, CLAY, some silt, trace fine sand, (moist)
							0.61		
J-2	SS	0.61 / 1.22	0.61	2.5		5, 8, 9, 11	1.22		Very stiff, brown, CLAY, some silt, trace fine sand (moist)
J-3	SS	1.22 / 1.83	0.61	3.0		4, 8, 8, 8	1.93		
									BHT @ 1.93m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: JOHNSTON MEMORIAL
5' FROM EDGE OF PAVEMENT (HAMBURG BY)

Boring No. J-1 | Date: 8-9-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: HSA | Size: 171.5 mm

Water Level | Time | Date

Boring Began: 8-9-96 | Completed: 8-9-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/(HUGHES)

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
J-1	SS	0.0 / 0.61	0.36	4.0		3 8 8 12	0.0 0.61		Medium dense, brown, silty, fine to coarse SAND, trace chert fragments. (DAMP)
J-2	SS	0.61 / 1.22	0.40	4.5		7 25 45 50	1.22		very dense, brown, silty f-C SAND AND WEATHERED CHERT FRAGMENTS (DAMP)
J-3	SS	1.22 / 1.85	0.25	4.5		16 50	1.53 1.83		
J-4	SS	1.85 / 2.44	0.22	4.5		20 50	2.14 2.44		
J-5	SS	2.44 / 2.74	0.27	4.5		23 53	2.74		BMTC @ 2.74

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: JOHNSTON MEMORIAL

Boring No. J-2 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 117-5 mm

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

	Water Level			
Time				
Date				

Sample Number	Sample Type	Depth From --To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)

DESCRIPTION

0-0.09 m AC

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
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   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: BLOODY POINT (PARKING AREA)

Boring No. BP-1 | Date: 8-8-96 | Sheet of

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112-mm 5

Water Level | Time | Date

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.00	
							0.31	
J-1	SS	0.31 - 0.91	0.51	3.0		6 4 3 4	0.91	
J-2	SS	0.91 - 1.52	0.61	4.5		4 6 13 15	1.52	
J-3	SS	1.52 - 2.13	0.61	4.5+		4 7 15 16	2.13	

0.00-0.09m AC

Medium stiff to very hard, reddish brown, SILT, trace clay, trace fine Sand (moist)

BHTD 2.13m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: BLOODY POINT (PARKING AREA)

Boring No. BP-2 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112 mm - 5

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level | | | |
Time | | | |
Date | | | |

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
S-1	SS	0.31 - 0.91	0.53	4.0		4 6 3 3	0.91	
S-2	SS	0.91 - 1.52	0.61	4.5		1 4 7 11	1.52	
S-3	SS	1.52 - 2.13	0.61	4.5		3 7 11 14	2.13	

DESCRIPTION

0-0.6m - AC

Medium Stiff to Very Stiff, Red, brown, f-m Sandy, CLAY, trace silt (moist)

BHT @ 2.13m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 5020(1)

Boring Location: BROWN'S LANDING RD

Boring No. BL-1 | Date: 8-12-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type:

Casing Used: HSA | Size: 171-5 mm

Boring Began: 8-12-96 | Completed: 8-12-96

Ground Elevation: | Weather: CLOUDY

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level | | | |

Time | | | |

Date | | | |

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
J-1	SS	0.0 / 0.61	0.20	—		7 9 4 3	0.61		Medium dense, brown, silty SAND, trace shell fragments.
J-2	SS	0.61 / 1.22	0.61	4.25		3 6 9 14	1.22		Stiff to very stiff, brown, CLAY, trace fine sand (moist)
J-3	SS	1.22 / 1.93	0.61	4.5+		5 12 17 20	1.93		BOT @ 1.93

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHILO 502(1)

Boring Location: BROWNS LANDING RD

Boring No. BL-2 | Date: 8-12-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: H.S.A | Size: 191.5 mm

Boring Began: 8-12-96 | Completed: 8-12-96

Ground Elevation: | Weather: CLOUDY

Inspector: THORTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level
Time
Date

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
J-1	SS	0-0 / 0-61	0.34	2.0		3 3	0-0	
						2 2	0.61	
J-2	SS	0.61 / 1.22	0.61	4.0		3 4	0	
						9 11	1.22	
J-3	SS	1.22 / 1.93	0.61	4.0		4 4		
						17 18	1.93	

DESCRIPTION

Soft to very stiff, brown, Silty CLAY, trace to little fine Sand. (moist)

BOTT @ 1.93m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: BROWN'S LANDING ROAD

Boring No. BL-3 | Date: 8-12-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: HSA | Size: 171-5 mm

Water Level | Time | Date

Boring Began: 8-12-96 | Completed: 8-12-96

Ground Elevation: | Weather: CLOUDY

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
J-1	SS	0-0 / 0.61	0.61	—		5 12 3 2	0.61	
J-2	SS	0.61 / 1.22	0.61	4.0		1 1 2 4	1.22	
J-3	SS	1.22 / 1.93	0.61	2.0 / 4.5		2 6 10 14	1.93	

DESCRIPTION

Medium dense, brown, silty SAND, some chert fragments.

very soft to very stiff, brown, silty CLAY, trace fine sand (moist

BMT @ 1.93 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: BROWN'S LANDING RD

Boring No. BL-4 | Date: 8-12-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: HSA | Size:

Water Level | Time | Date

Boring Began: 8-12-96 | Completed: 8-12-96

Ground Elevation: | Weather: CLOUDY

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
1-1	SS	0.0 / 0.61	0.25	1.5		2 2 3 4	0.61	
1-2	SS	0.61 / 1.22	0.61	3.5		3 6 11 14	1.22	
1-3	SS	1.22 / 1.93	0.61	4.25		4 6 10 12	1.93	

DESCRIPTION

soft to very stiff, brown, CLAY, some silt, trace fine sand (moist)

BMT @ 1.93

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet: plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: BROWN'S LANDING RD

Boring No. BL-5 | Date: 8-12-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: HSA | Size: 171.5mm

Water Level | Time | Date

Boring Began: 8-12-96 | Completed: 8-12-96

Ground Elevation: | Weather: CLEAR

Inspector: Thornton | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)	DESCRIPTION
J-1	SS	0-0 / 0-61	0.35	1.5		1 1 2 4	0.61		Very soft, brown, silty CLAY, trace fine sand (moist)
J-2	SS	0-61 / 1-22	0-61	3.75		3 5 9 12	1-22		Stiff to very stiff, brown, CLAY, trace fine sand (moist)
J-3	SS	1-22 / 1-93	0-61	3-5		3 12 12 16	1.93		BMT @ 1.93 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PEACH ORCHARD (PARKING AREA)

Boring No. PO-1 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112 mm

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level / Time / Date

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.56	4.0		1 / 1		
						3 / 6	0.91	
J-2	SS	0.91 / 1.52	0.61	4.5+		3 / 7		
						10 / 12	1.52	

DESCRIPTION

0.07 m AC

SOFT to very stiff, brown, CLAY, some silt, trace fine sand (moist-

BHT @ 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: PEACH ORCHARD (PARKING AREA)

Boring No. PO-2 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112 mm

Water Level | | | |

Time | | | |

Date | | | |

Boring Began: | Completed:

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
1-1	SS	0.31 / 0.91	0.61	4.0		1 / 1		
						4 / 7	0.91	
1-2	SS	0.31 / 0.91	0.61	+4.5		4 / 6		
						10 / 12	1.52	

DESCRIPTION

0.06 m AC

Soft to very stiff, brown, CLAY, some silt, trace fine sand (moist)

BMT @ 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 602(1)

Boring Location: HAMBURG SAVANNAH RD

Boring No. HS-1 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: HZ-mm-S

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY, HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level | Time | Date

Sample Number	Sample Type	Depth From -To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.0	
							0.31	
S-1	SS	0.31 - 0.91	0.50	1.5		1, 2		
						1, 4	0.91	
S-2	SS	0.91 - 1.52	0.61	3.5		2, 5		
						10, 11	1.52	

DESCRIPTION

0.06 m AC

very soft to stiff, brown, CLAY, some silt, trace fine sand (moist)

BOT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
3. Major Grain Size - Composes more than 50% of the sample
4. Modifying Term "AND" : 40% to 50% of the minor grain size
   "SOME" : 10% to 40%
   "TRACE" : 10% or less
5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: HAMBURG SAVANNAH RD

Boring No. HS-2 | Date: 8-7-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112-mm

Boring Began: 8-7-96 | Completed: 8-7-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY/HUGHES

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.6			3 / 3		
						7 / 9		
J-2	SS	0.91 / 1.52	0.61			3 / 9		
						11 / 16		

DESCRIPTION

0.08m AC

Medium Stiff, to very Stiff, Red, CLAY, trace silt, trace fine sand (moist)

BHT @ 1.52

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
2. Color
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4. Modifying Term "AND" : 40% to 50% of the minor grain size
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For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: HAMBURG SAVANNAH RD

Water Level			
Time			
Date			

Boring No. HS-5 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 112 mm

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY / HUGHES

Hammer Weight 63.5 +/- 1kg

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
J-1	SS	0.31 / 0.91	0.38	1.75		6 / 2		
						1 / 2	0.91	
J-2	SS	0.91 / 1.52	0.61	4.0		2 / 5 / 8 / 14	1.52	

DESCRIPTION

0.07 m AC

soft to stiff, brown, silty CLAY, trace fine sand (moist)

BOHT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

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ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

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VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
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For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
(10% - 40%) (1% - 10%)

FORM: FHWA-15-62M (Rev. 3-96)

BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

Project Name: PRA SHIL 502(1)

Boring Location: HAMBURG SAVANNAH RD

Boring No. HS-6 | Date: 8-8-96 | Sheet 1 of 1

Type of Boring: SS | Drilling Mud Type: N/A

Casing Used: SOLID | Size: 117-mm-5

Boring Began: 8-8-96 | Completed: 8-8-96

Ground Elevation: | Weather: CLEAR

Inspector: THORNTON | Operator: KINGSLEY | MAGNUM

Hammer Weight 63.5 +/- 1kg

Water Level			
Time			
Date			

Sample Number	Sample Type	Depth From -- To (Meters)	Total Length of Recovered Sample	Pocket Penetrometer Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler for 150mm Increments	Depth (Meters)	Elevation (Meters)
							0.31	
S-1	SS	0.31 / 0.91				3 / 5 / 8 / 13	0.91	
S-2	SS	0.91 / 1.52				6 / 14 / 20 / 22	1.52	

DESCRIPTION

0.09m AC

stiff to hard, reddish brown, silty CLAY, fine sand

BOHT @ 1.52 m

GENERAL NOTES

Drilling and Sampling Symbols

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted
ST: Shelby Tube - 50mm O.D., except where noted
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

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Component	Distinguishing Features
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Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

Order of Description

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2. Color
3. Major Grain Size - Composes more than 50% of the sample
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5. Minor Grain Size (s)
6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

(1) (2) (3) (4) (5) (4) (5) (6)
Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)
↑ ↑
(10% - 40%) (1% - 10%)

APPENDIX D - Laboratory Data

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF: JAR SAMPLES — DATE: 1-14-97

STATE: TN — PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-1 / 8-8-96 — SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

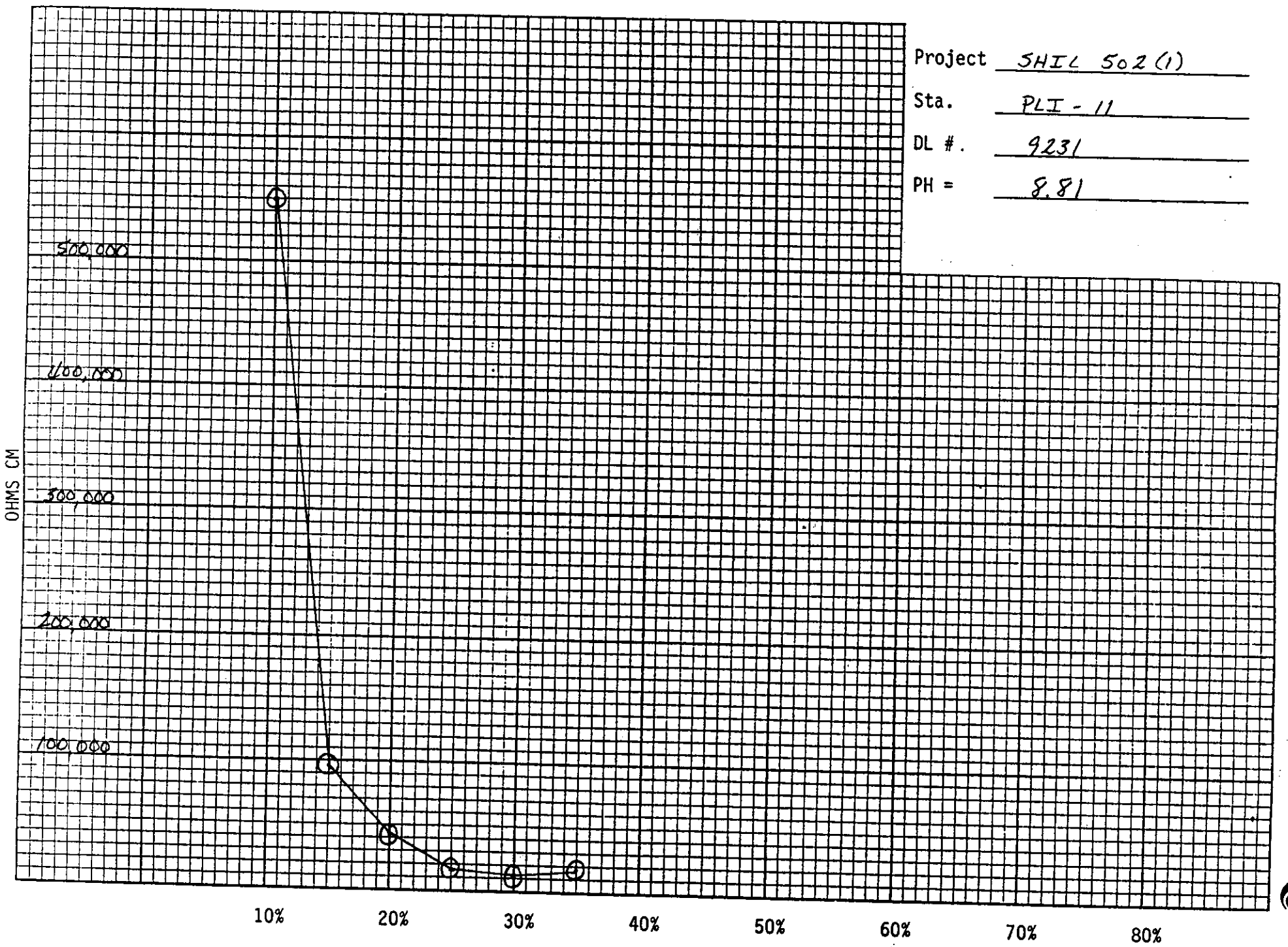
D.L. REPORT #	9224	9225	9227	9228	9229	9230	9231	
FIELD #	PLI-1/J-1	PLI-2/J-1	PLI-4/J-1	PLI-3/J-2	PLI-9/J-1	PLI-10/J-2	PLI-11/J-1	
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9	0.3-.09	0.9-1.5	0-.6	.6-1.2	0-.6	

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE				100	100			
3/8-INCH SIEVE				90	94			
#4 SIEVE(4.7mm)	100			82	83	100	100	
#10 SIEVE(/2.0mm)	99			75	69	99	99	
#40 SIEVE(0.42mm)	99			67	56	98	99	
#200 SIEVE(0.074mm)	60.7			50.3	40.7	78.7	85.0	
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	20.0	18.9	14.8	20.3	12.0	18.6	17.2	
LIQUID LIMIT (LL)	39			28	*	38	34	
PLASTICITY INDEX (PI)	22			12	*	15	17	
CLASSIFICATION	A-6 (11)			A-6 (3)	*	A-6(12)	A-6(13)	

REMARKS:
* Not enough material to perform test.

REPORTED BY: Chris Johnson


Project SHIL 502 (1)
Sta. PLI - 11
DL #. 9231
PH = 8.81
500,000
400,000
300,000
200,000
100,000
OHMS CM
10%
20%
30%
40%
50%
60%
70%
80%
22-115 · CROSS SECTION - 10 SQUARES TO INCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-8 / 8-12-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

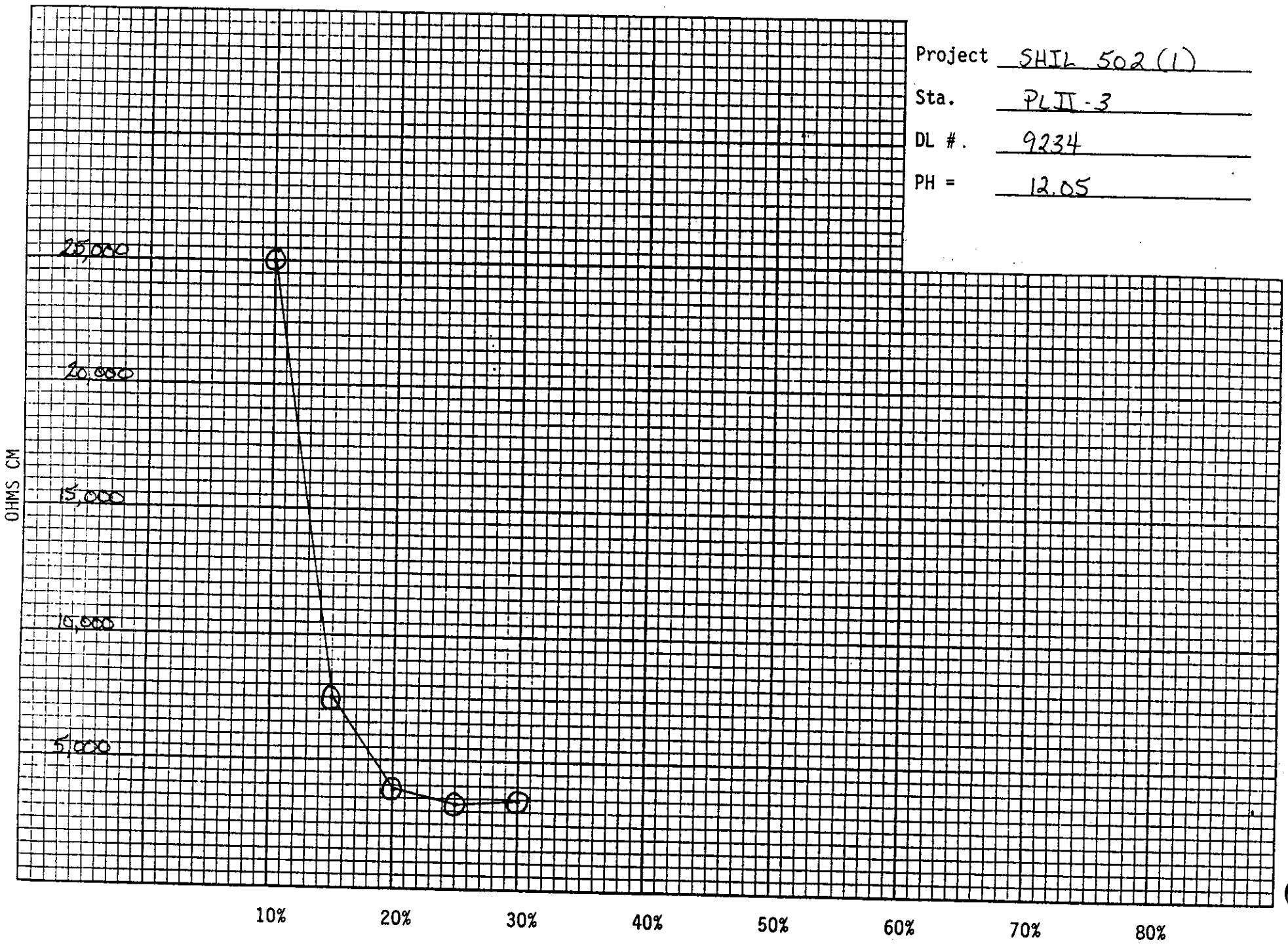
D.L. REPORT #	9232	9233	9234	9235	9236	9237		
FIELD #	PLII-1/J-1	PLII-2/J-1	PLII-3/J-1	PLII3/J-3	E-1/J-1	E-2/J-2		
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9	0.3-0.9	2.1-2.7	0.3-0.9	0.9-1.5		

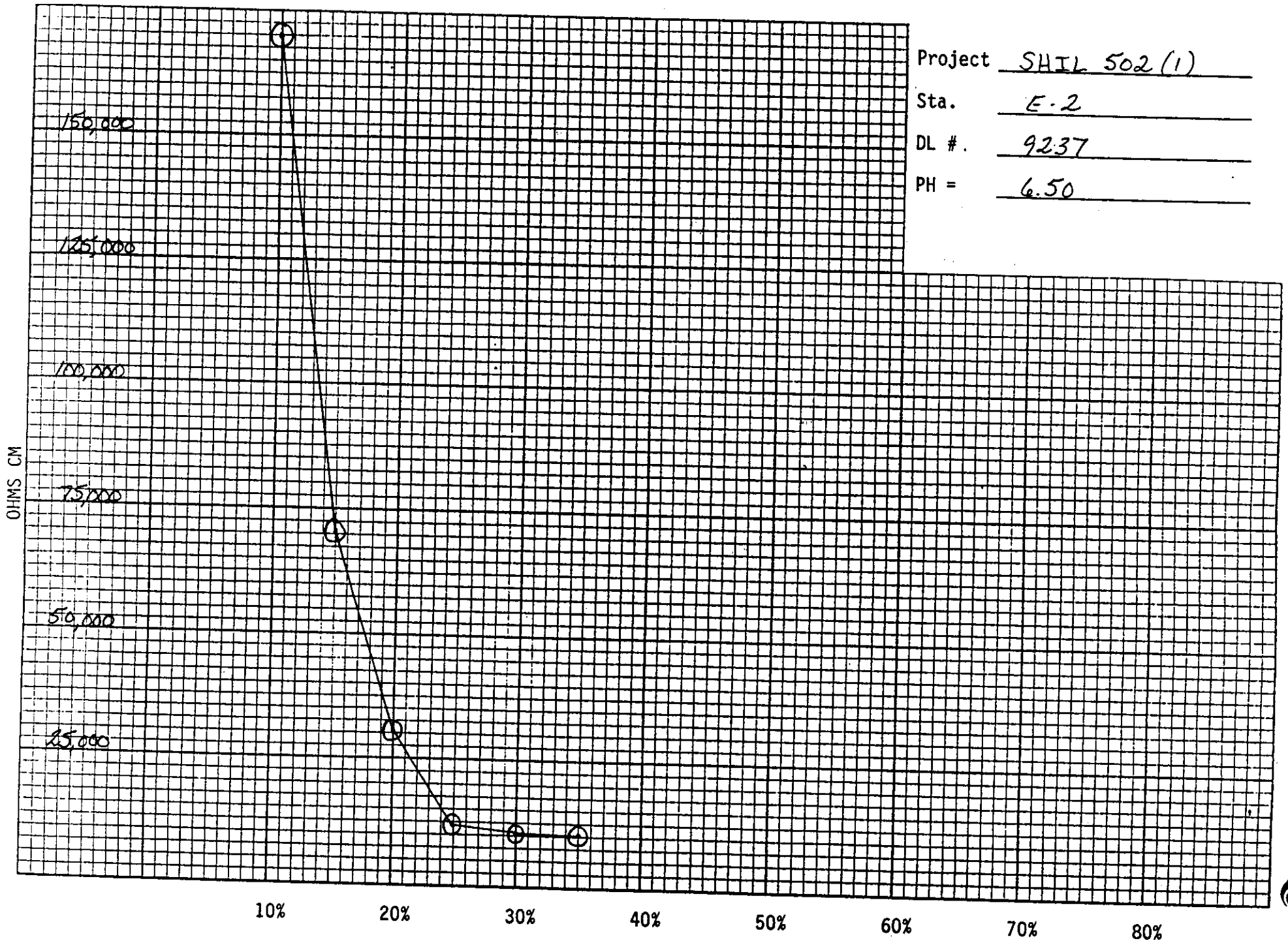
CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE			100	100				
3/4-INCH SIEVE			94	98				
3/8-INCH SIEVE			74	73	100	100		
#4 SIEVE (4.7mm)	100		61	61	100	99		
#10 SIEVE (2.0mm)	97		52	51	100	98		
#40 SIEVE (0.42mm)	96		43	43	99	97		
#200 SIEVE (0.074mm)	82.6		25.5	27.3	84.0	69.4		
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	18.2	12.4	11.3	11.8	21.9	20.1		
LIQUID LIMIT (LL)	32		21	24	40	48		
PLASTICITY INDEX (PI)	15		N.P.	N.P.	19	26		
CLASSIFICATION	A-6 (11)		A-2-4 (0)	A-2-4 (0)	A-6 (16)	A-7-6 (17)		

REMARKS:

REPORTED BY: Chris Johnson


Project SHIL 502(1)
Sta. PLII-3
DL #. 9234
PH = 12.05
25,000
20,000
15,000
10,000
5,000
OHMS CM
10%
20%
30%
40%
50%
60%
70%
80%
22-115 · CROSS SECTION · 10 SQUARES TO INCH


Project SHIL 502 (1)
Sta. E-2
DL #. 9237
PH = 6.50
150,000
125,000
100,000
75,000
50,000
25,000
OHMS CM
10%
20%
30%
40%
50%
60%
70%
80%
AMES 22-115 - CROSS SECTION - 10 SQUARES TO INCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF: JAR Sample | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-1-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION									
D.L. REPORT #	9238								
FIELD #	S-1/J-1								
STATION #									
ELEVATION\DEPTH	0.3-0.9								

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING									
2-INCH SIEVE									
1 1/2 INCH SIEVE									
1-INCH SIEVE									
3/4-INCH SIEVE									
3/8-INCH SIEVE	100								
#4 SIEVE (4.7mm)	99								
#10 SIEVE (/2.0mm)	99								
#40 SIEVE (0.42mm)	98								
#200 SIEVE (0.074mm)	90.4								
% SMALLER THAN : 0.050mm									
0.020mm									
0.005mm									
0.002mm									
0.001mm									
--PROCTOR-- MAX. DENSITY									
OPT. MOISTURE									
-- C B R --									
MOISTURE CONTENT %	15.4								
LIQUID LIMIT (LL)	45								
PLASTICITY INDEX (PI)	27								
CLASSIFICATION	A-7-6(25)								

REMARKS:

REPORTED BY: Chris Johnson

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN | PROJECT: SHL SOE (1)

DATE SAMPLED: 8-6-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9239	9240	9241	9242	9243			
FIELD #	VC-1/J-1	VC-2/J-1	VC-3/J-2	VC-4/J-1	VC-5/J-1			
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9	0.9-1.5	0.3-0.9	0.3-0.9			

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE			100					
3/4-INCH SIEVE			96					
3/8-INCH SIEVE			92					
#4 SIEVE (4.7mm)	100		86		100			
#10 SIEVE (2.0mm)	99		83		100			
#40 SIEVE (0.42mm)	98		78		99			
#200 SIEVE (0.074mm)	87.8		64.7		85.3			
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	18.7	19.8	16.5	19.0	20.0			
LIQUID LIMIT (LL)	34		34		40			
PLASTICITY INDEX (PI)	16		18		21			
CLASSIFICATION	A-6 (13)		A-6 (9)		A-6 (18)			

REMARKS:

REPORTED BY: Chris Johnson

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF: JAR SAMPLES | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-13/8-14-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9245	9246	9247	9248	9249	9250	9251	9252
FIELD #	CP-1/J-1	CP-2/J-1	CP-3/J-1	CP-4/J-1	CP-5/J-1	CP-6/J-1	CP-7/J-1	CP-7/J-4
STATION #								
ELEVATION\DEPTH	0.2-0.8	0.2-0.8	0.2-0.8	0.2-0.8	0.1-0.7	0.1-0.7	0.2-0.8	2-2.6

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE								
3/8-INCH SIEVE	100		100		100		100	100
#4 SIEVE (4.7mm)	100		99		96		98	95
#10 SIEVE (/2.0mm)	99		98		95		91	90
#40 SIEVE (0.42mm)	98		97		94		87	87
#200 SIEVE (0.074mm)	87.5		77.8		88.1		80	82
% SMALLER THAN : 0.050mm							50.2	59.2
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	19.4	21.0	16.6	21.0	24.9	20.0	17.8	27.5
LIQUID LIMIT (LL)	34		33		35		21	21
PLASTICITY INDEX (PI)	15		15		15		N.P.	N.P
CLASSIFICATION	A-6 (13)		A-6 (10)		A-6 (13)		A-4 (0)	A-4 (0)

REMARKS:

REPORTED BY: Chris Johnson

Project SHIL 502 (1)

Sta. CP-3

DL #. 9247

PH = 7.69

OHMS CM

Not enough material to perform electrical resistivity

10% 20% 30% 40% 50% 60% 70% 80%

AMPAD 22-115 - CROSS SECTION - 10 SQUARES TO INCH

Project SHIL 502 (1)

Sta. CP-6

DL #. 9250

PH = 4.62

OHMS CM

* Not enough material to perform electric Resistivity *

10% 20% 30% 40% 50% 60% 70% 80%

AMPAD 22-115 - CROSS SECTION - 10 SQUARES TO INCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF JAR SAMPLES | DATE: 1-14-97

STATE: TN | PROJECT: SHIL S02(1)

DATE SAMPLED: 8-13 / 8-14-97 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9253	9254	9255	9256	9257	9258		
FIELD #	CP-8 / J-1	CP-9 / J-2	CP-9 / J-5	CP-10 / J-1	CP-11 / J-1	CP-13 / J-1		
STATION #								
ELEVATION\DEPTH	0.2-0.8	0.8-1.4	2.7-3.3	0.1-0.7	0.1-0.7	0-0.6		

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE	100				100			
3/4-INCH SIEVE	93	100	100		94			
3/8-INCH SIEVE	72	96	95	100	79			
#4 SIEVE (4.7mm)	60	93	92	97	69			
#10 SIEVE (2.0mm)	54	91	89	96	63			
#40 SIEVE (0.42mm)	46	87	81	95	54			
#200 SIEVE (0.074mm)	30.8	54.7	42.6	84.9	38.3			
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	15.5	18.9	17.7	20.3	13.2	16.0		
LIQUID LIMIT (LL)	22	18	15	37	27			
PLASTICITY INDEX (PI)	6	N.P.	N.P.	17	11			
CLASSIFICATION	A-2-4(0)	A-4(0)	A-4(0)	A-6(14)	A-6(1)			

REMARKS:

REPORTED BY: Chris Johnson

Project SHIL 502(1)

Sta. CP-11

DL #. 9257

PH = 6.83

OHMS CM

* Not enough material to perform electrical resistivity *

10% 20% 30% 40% 50% 60% 70% 80%

22-115 · CROSS SECTION · 10 SQUARES TO INCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF: JAR SAMPLES | DATE: 1-14-97

STATE: TN | PROJECT: SHIL SU2 (1)

DATE SAMPLED: 8-6-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

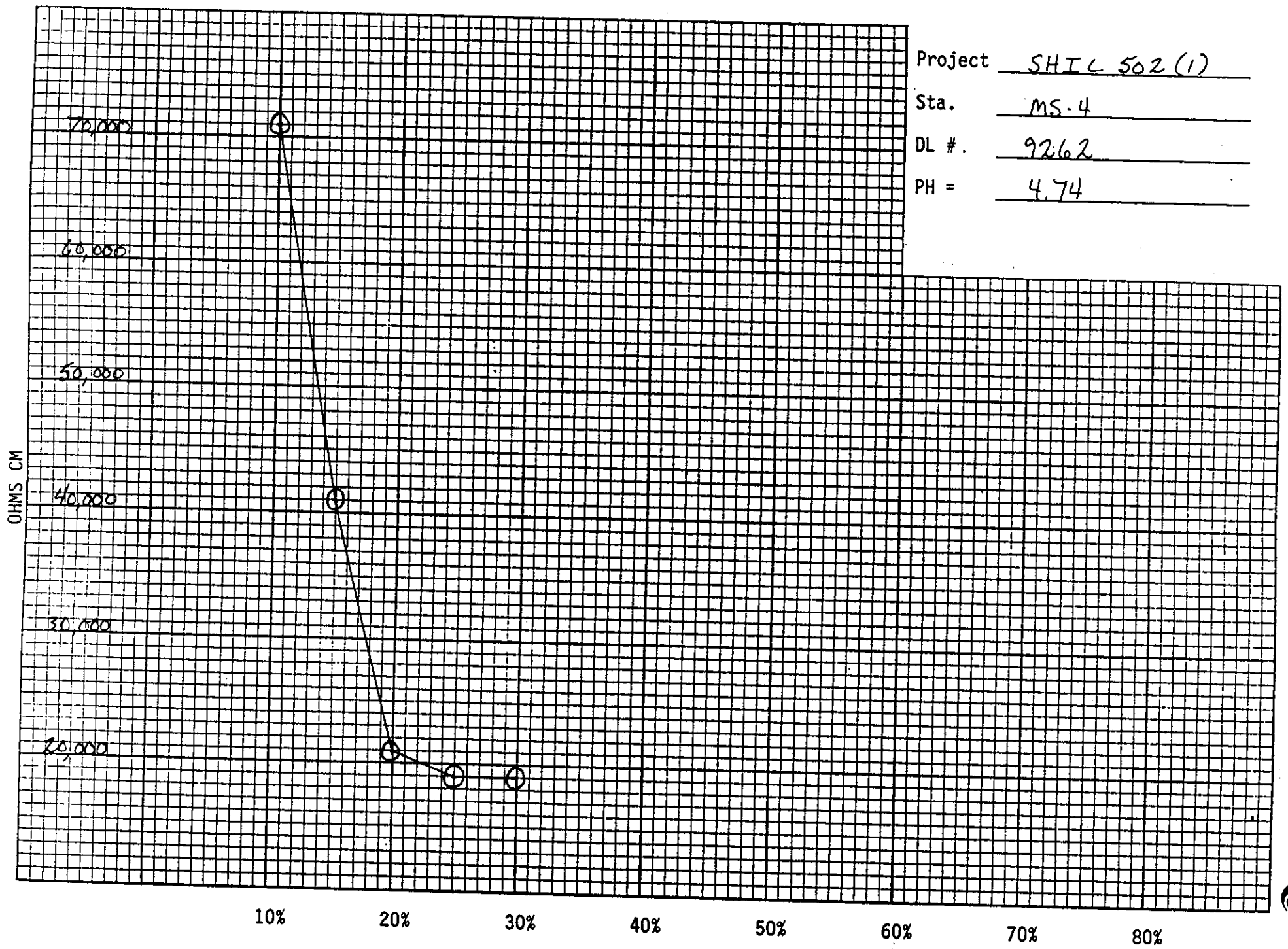
D.L. REPORT #	9259	9260	9261	9262	9263			
FIELD #	MS-1/J-1	MS-2/J-1	MS-3/J-1	MS-4/J-1	MS-5/J-1			
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9	0.3-0.9	0.3-0.9	0.3-0.9			

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE								
3/8-INCH SIEVE				100				
#4 SIEVE (4.7mm)			100	98				
#10 SIEVE (2.0mm)	100		100	98				
#40 SIEVE (0.42mm)	100		99	98				
#200 SIEVE (0.074mm)	97.1		90.5	93.9				
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	22.6	15.6	17.0	22.2	25.8			
LIQUID LIMIT (LL)	32		38	39				
PLASTICITY INDEX (PI)	14		18	17				
CLASSIFICATION	A-6 (13)		A-6 (17)	A-6 (17)				

REMARKS:

REPORTED BY: Chris Johnson


Project SHIC 502(1)
Sta. MS-4
DL #. 9262
PH = 4.74
70,000
60,000
50,000
40,000
30,000
20,000
OHMS CM
10%
20%
30%
40%
50%
60%
70%
80%
22-115 · CROSS SECTION · 10 SQUARES TO INCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-6-97 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9264	9266						
FIELD #	R-1/J-1	R-3/J-1						
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9						

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE								
3/8-INCH SIEVE								
#4 SIEVE(4.7mm)	100							
#10 SIEVE(/2.0mm)	100	100						
#40 SIEVE(0.42mm)	97	99						
#200 SIEVE(0.074mm)	79.4	85.4						
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	18.8	17.2						
LIQUID LIMIT (LL)	47	48						
PLASTICITY INDEX (PI)	22	26						
CLASSIFICATION	A-7-6(18)	A-7-6(23)						

REMARKS:

REPORTED BY: Chris Johnson

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-7 / 8-13-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9267	9268	9269	9270	9271	9272		
FIELD #	BB-1/J-4	BB-1/J-6	BB-2/J-3	BB-2/J-6	RS-1/J-1	R-3-2/J-1		
STATION #								
ELEVATION\DEPTH	1.9-2.5	3.1-3.8	1.2-1.9	3.1-3.8	0.8-0.9	0.3-0.9		

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE	100							
1-INCH SIEVE	94		100		100			
3/4-INCH SIEVE	90		97		96			
3/8-INCH SIEVE	75		81	100	90			
#4 SIEVE (4.7mm)	63		70	99	84			
#10 SIEVE (2.0mm)	49	100	61	98	78	100		
#40 SIEVE (0.42mm)	33	99	45	84	71	100		
#200 SIEVE (0.074mm)	14.9	90.0	25.9	12.1	57.9	95.0		
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR--								
MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	9.6	38.0	17.0	22.0	15.2	22.2		
LIQUID LIMIT (LL)	N.D.	71	27	N.D.	30	41		
PLASTICITY INDEX (PI)	N.P	44	N.P.	N.P.	12	19		
CLASSIFICATION	A-1-b (0)	A-7-6 (45)	A-2-4 (0)	A-2-4 (0)	A-6 (4)	A-7-6 (20)		

REMARKS:

REPORTED BY: Ali Johnson

Project SHIL 502(1)

Sta. EC-2

DL #. 9275

PH = 6.42

OHMS CM

* Not enough material to perform electric resistivity *

10% 20% 30% 40% 50% 60% 70% 80%

AMPAD 22-115 - CROSS SECTION - 10 SQUARES TO INCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-7-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9274	9275	9276					
FIELD #	EC-1/J-1	EC-2/J-1	EC-3/J-2					
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9	0.9-1.5					

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE			100					
3/8-INCH SIEVE			98					
#4 SIEVE(4.7mm)			95					
#10 SIEVE(/2.0mm)	100		93					
#40 SIEVE(0.42mm)	99		91					
#200 SIEVE(0.074mm)	87.9		68.0					
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	19.4	19.2	14.1					
LIQUID LIMIT (LL)	37		45					
PLASTICITY INDEX (PI)	17		27					
CLASSIFICATION	A-6(15)		A-7-6(16)					

REMARKS:

REPORTED BY: Chi Johnson

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN | PROJECT: SHIL SD 2 (1)

DATE SAMPLED: 8-7-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9277							
FIELD #	T-3/J-1							
STATION #								
ELEVATION\DEPTH	0-0.6							

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE								
3/8-INCH SIEVE								
#4 SIEVE (4.7mm)	100							
#10 SIEVE (/2.0mm)	100							
#40 SIEVE (0.42mm)	100							
#200 SIEVE (0.074mm)	89.4							
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	20.5							
LIQUID LIMIT (LL)	36							
PLASTICITY INDEX (PI)	17							
CLASSIFICATION	A-6(15)							

REMARKS:

REPORTED BY: Chris Johnson

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Sample | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-9-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

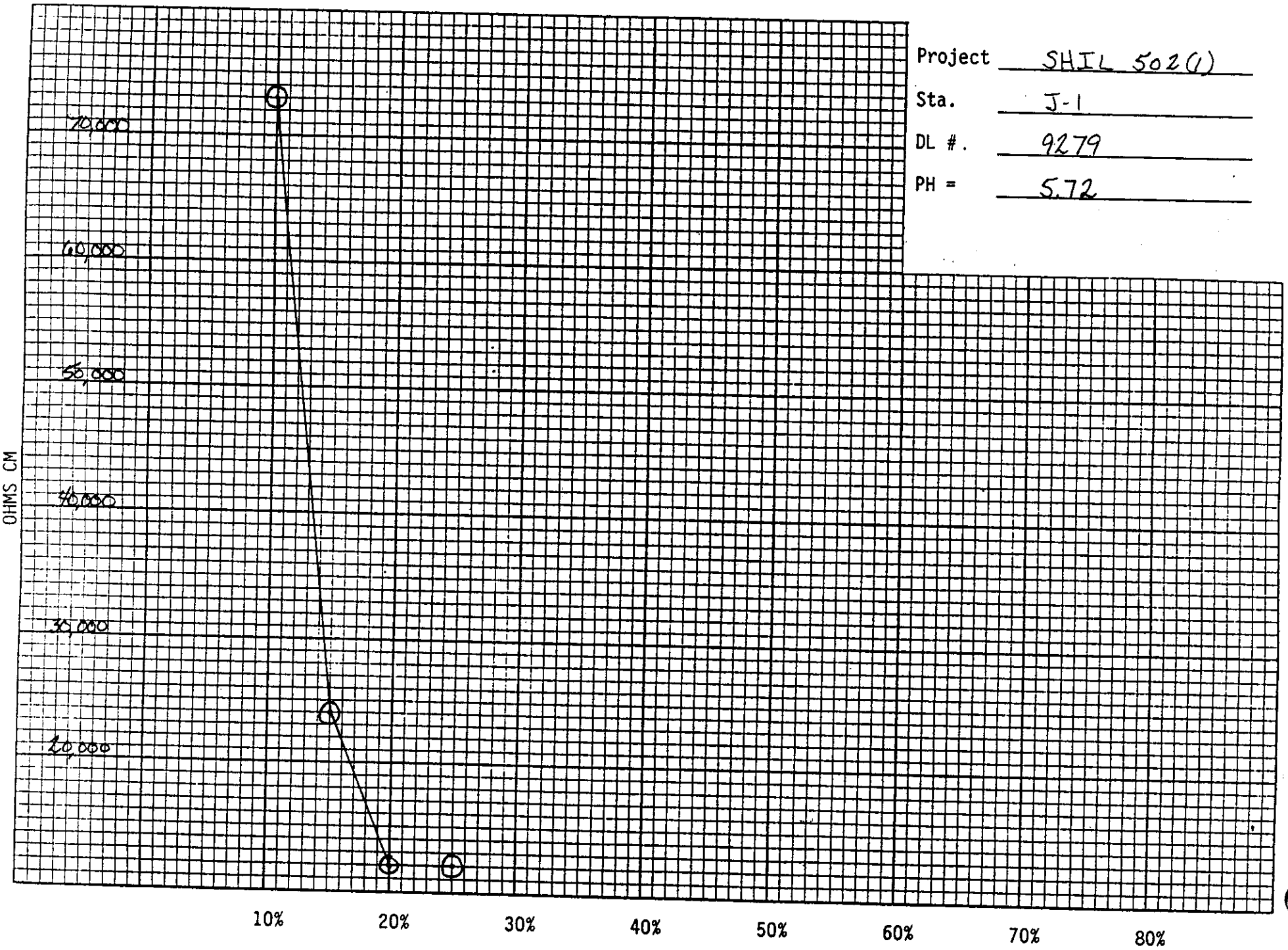
D.L. REPORT #	9279							
FIELD #	J-1/J-1							
STATION #								
ELEVATION\DEPTH	0-0.6							

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE	100							
3/4-INCH SIEVE	88							
3/8-INCH SIEVE	81							
#4 SIEVE(4.7mm)	76							
#10 SIEVE(/2.0mm)	72							
#40 SIEVE(0.42mm)	68							
#200 SIEVE(0.074mm)	49.3							
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	6.9							
LIQUID LIMIT (LL)	36							
PLASTICITY INDEX (PI)	N.P							
CLASSIFICATION	A-4(0)							

REMARKS:

REPORTED BY: Ch. Johnson


Project SHIL 502(1)
Sta. J-1
DL #. 9279
PH = 5.72
70,000
60,000
50,000
40,000
30,000
20,000
OHMS CM
10%
20%
30%
40%
50%
60%
70%
80%
22-115 · CROSS SECTION · 10 SQUARES TO INCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-7-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION								
D.L. REPORT #	9280	9281						
FIELD #	PO-1/J-1	PO-2/J-1						
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9						

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE								
3/8-INCH SIEVE								
#4 SIEVE (4.7mm)	100							
#10 SIEVE (/2.0mm)	100							
#40 SIEVE (0.42mm)	100							
#200 SIEVE (0.074mm)	92.8							
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	22.9	18.9						
LIQUID LIMIT (LL)	37							
PLASTICITY INDEX (PI)	18							
CLASSIFICATION	A-6 (17)							

REMARKS:

REPORTED BY: Chi Johnson

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-8-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9282	9283						
FIELD #	BP-1/J-1	BP-2/J-1						
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9						

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE		100						
3/8-INCH SIEVE		94						
#4 SIEVE (4.7mm)	100	90						
#10 SIEVE (2.0mm)	99	86						
#40 SIEVE (0.42mm)	99	79						
#200 SIEVE (0.074mm)	88.4	69.1						
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	20.4	15.7						
LIQUID LIMIT (LL)	31	32						
PLASTICITY INDEX (PI)	N.P.	13						
CLASSIFICATION	A-4 (1)	A-6 (7)						

REMARKS:

REPORTED BY: Chi Johnson

Project SHIL 502 (1)

Sta. BP-1

DL #. 9282

PH = 4.52

OHMS CM

* Not enough material to perform electric Resistivity *

10% 20% 30% 40% 50% 60% 70% 80%

AMPAD 22-115 · CROSS SECTION - 10 SQUARES TO INCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Sample | DATE: 1-14-97

STATE: TN | PROJECT: SHIL 502 (1)

DATE SAMPLED: 8-9-96 | SAMPLED FROM:

SUBMITTED BY: WILL BASSETT

IDENTIFICATION

D.L. REPORT #	9284							
FIELD #	MO-1/J-1							
STATION #								
ELEVATION\DEPTH	0.3-0.9							

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE								
3/8-INCH SIEVE								
#4 SIEVE (4.7mm)								
#10 SIEVE (2.0mm)								
#40 SIEVE (0.42mm)								
#200 SIEVE (0.074mm)								
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	12.0							
LIQUID LIMIT (LL)								
PLASTICITY INDEX (PI)								
CLASSIFICATION								

REMARKS:

REPORTED BY: Chris Johnson

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Samples | DATE: 1-14-97

STATE: TN	PROJECT: SHIL 502 (1)
DATE SAMPLED: 8-12-96	SAMPLED FROM:
SUBMITTED BY: Will Bassett	

IDENTIFICATION								
D.L. REPORT #	9285	9286	9288	9289				
FIELD #	BL-1/J-1	BL-2/J-1	BL-4/J-1	BL-5/J-2				
STATION #								
ELEVATION\DEPTH	0.-0.6	0.-0.6	0-0.6	0.6-1.2				

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE	100	100						
3/8-INCH SIEVE	87	97						
#4 SIEVE(4.7mm)	77	93						
#10 SIEVE(/2.0mm)	68	90	100	100				
#40 SIEVE(0.42mm)	52	86	97	98				
#200 SIEVE(0.074mm)	33.6	74.3	93.6	84.6				
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	8.1	17.5	21.1	19.6				
LIQUID LIMIT (LL)	N.O.	32	34	36				
PLASTICITY INDEX (PI)	N.P.	14	11	19				
CLASSIFICATION	A-2-4(0)	A-6 (9)	A-6 (11)	A-6 (15)				

REMARKS:

REPORTED BY: Chris Johnson

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REPORT ON SAMPLES OF Jar Sample | DATE: 1-14-97

STATE: TN	PROJECT: SHIL 502(1)
DATE SAMPLED: 8-12-96	SAMPLED FROM:
SUBMITTED BY: WILL BASSETT	

IDENTIFICATION

D.L. REPORT #	9290							
FIELD #	V-1/J-1							
STATION #								
ELEVATION\DEPTH	0-0.6							

CLASSIFICATION TEST RESULTS

MECHANICAL ANALYSIS % PASSING								
2-INCH SIEVE								
1 1/2 INCH SIEVE								
1-INCH SIEVE								
3/4-INCH SIEVE								
3/8-INCH SIEVE								
#4 SIEVE(4.7mm)	100							
#10 SIEVE(/2.0mm)	98							
#40 SIEVE(0.42mm)	97							
#200 SIEVE(0.074mm)	85.0							
% SMALLER THAN : 0.050mm								
0.020mm								
0.005mm								
0.002mm								
0.001mm								
--PROCTOR-- MAX. DENSITY								
OPT. MOISTURE								
-- C B R --								
MOISTURE CONTENT %	18.5							
LIQUID LIMIT (LL)	32							
PLASTICITY INDEX (PI)	N.P							
CLASSIFICATION	A-4 (1)							

REMARKS:

REPORTED BY: Chris Johnson

E-96-0432

U S DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Request for and Report of

SOIL CLASSIFICATION TEST

PROJECT SHIL 502(1) SAMPLE NO. PLT-3

SOURCE _____ PAY ITEM NO. _____

MATERIAL TO BE USED FOR _____

SAMPLED BY _____ FROM _____ DATE _____

PERSON AUTHORIZING TEST _____ DATE SHIPPED TO LAB _____

INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAB NO.	TEST RESULTS	SPECIFICATION
☒ AMOUNT FINER THAN 0.075 mm	T 11	1/21	E-96-0432	TO BE LISTED ON THE REVERSE SIDE	"
☒ SIEVE ANALYSIS	T 27	1/22	"	TO BE LISTED ON THE REVERSE SIDE	
☒ LIQUID LIMIT	T 89	1/22	"	35 ✓	
☒ PLASTIC LIMIT	T 90	1/22	"	17 ✓	
☒ PLASTIC INDEX	T 90	1/22	"	18 ✓	
☒ CLASSIFICATION	T 317	1/28	"	A-6(14)	
☐ PARTICLE SIZE BY HYDROMETER	T 88				
☒ OTHER	T 99 C	1/23	E-96-0432	Max Den: 117.4 ✓ % Moist: 14.0 ✓	
☒ OTHER	T193	1/24	"	CBR 7.2 ✓	

REMARKS: Forward original copy to Regional Lab
Forward one copy with sample
Retain one copy in Project records

M W Vivier

Marcel W. Vivier
EFLHD Materials Engineer

Reported by: Nathanael Dam
Name

1/28/97
Date

FORM FHWA 15-99-A 5/76

E-96-0432

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Project: SHIL 502(1) Source:

Where Sampled: Depth 0-1.5m Quantity Represented:

Sample Of: soil Lot No.: Sample No.: PI-3

Sampled By: Date: 8/29/96 Tested By: Tatiana Date: 1/16/97

Method: T 99C Max. Dry Density: 117.4 Optimum Moisture: 14.0% Specific Gravity:

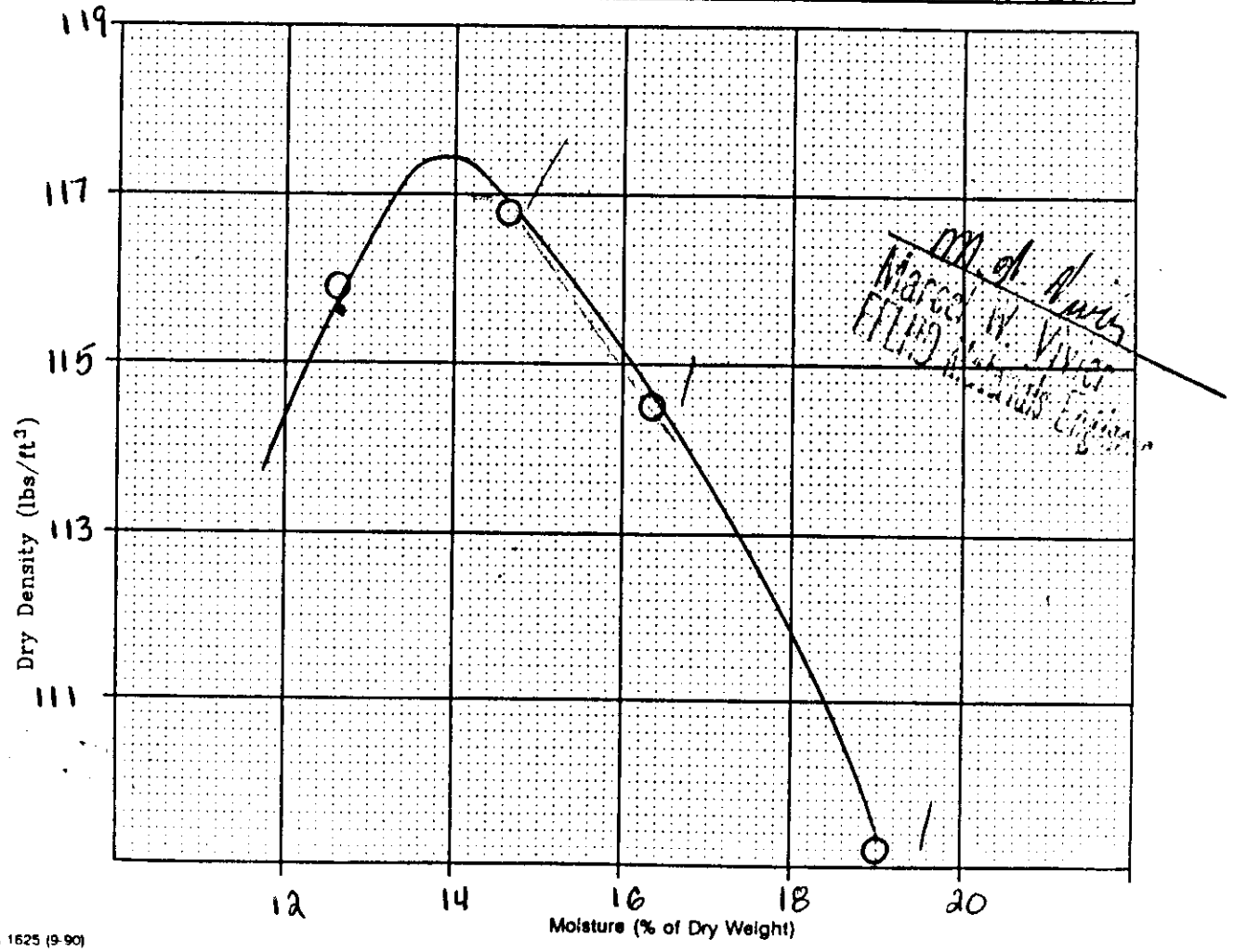
Density Determination

Test No.	A	B	C	D
(a) Wet Soil + Tare	6,211	6264	6254	6203
(b) Mold Tare	4242	4,242	4242	4242
(c) [a−b] Wet Wt.	4.34	4,46	4,44	4,32
(d) Wet Density (*)c lb/ft³	130.53	133,8	133,2	129.6
Dry Density [d / (1 + .01w)]	115.96	116,8	114.5	109.1

* A constant factor. Use 30.00 for AASHTO T 99 and 13.33 for AASHTO T 180.

Moisture Determination

Pan No.	C	G	E	C
(r) Wet Soil Wt. + Tare	550.5	407.6	400.8	458.6
(s) Dry Soil Wt. + Tare	508.0	374.7	366.2	410.8
(t) Container Tare Wt.	171.0	149.3	154.2	155.9
(u) Dry Soil Wt. [s−t]	337.0	225.4	212.0	254.9
(v) Water Wt. [r−s]	42.5	32.9	34.6	47.8
(w) % Moisture [v/u (100)]	12.6	14.6	16.3	18.8



Form FHWA 1625 (9-90)

E-96-0432

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

Project SHIL 502(1) Source

Where sampled Quantity represented

Sample of Soil Lot No. Sample No. PLI-3

Sampled By: Date: Tested by Nathaniel Jaw Date 1/22/97

TEST - - -	LIQUID LIMIT (%)		PLASTIC LIMIT (%)	
TEST NUMBER - - -	1	2	1	2
No. of blows (liquid limit test)	20	28		
Container No.	A1	A4	A10	A12
A Tare weight of container	15.28	15.44	15.54	15.23
B Weight of wet soil and container	32.97	31.14	18.40	18.16
C Weight of dry soil and container	28.30	27.14	17.99	17.71
D Weight of dry soil [C - A]	13.02	11.70	2.45	2.48
E Weight of moisture [B - C]	4.67	4.00	0.41	0.45
F Percent moisture $[\frac{E}{D}(100)]$	35.9	34.2	16.7	18.1
Liquid Limit[1]	35.0	34.7		
Plastic Limit[2] [F]			16.7	18.1

G. LIQUID LIMIT (mean) 35

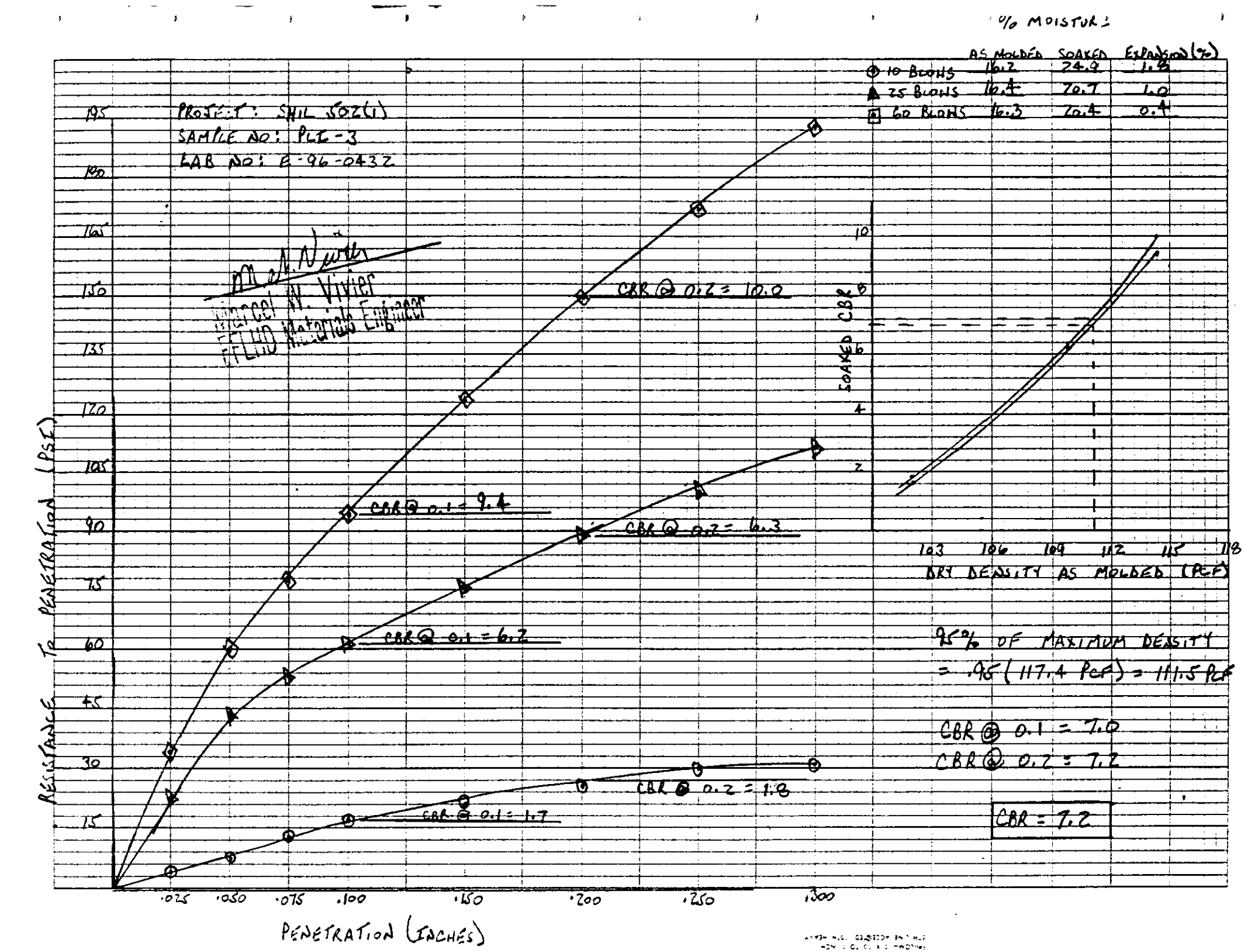
H. PLASTIC LIMIT (Mean) 17

PLASTIC INDEX [G - H] 18

M. W. Vivier
Marcel W. Vivier
EFLHD Materials Engineer

[1] Obtained using nomograph chart. See "Precision" statement in AASHTO T 89.
[2] See "Precision" statement in AASHTO T 90.

Form FHWA 1884 (8-96)


% MOISTURE
AS MOLDED SOAKED EXPANSION (%)
10 BLOWS 16.2 24.9 1.8
25 BLOWS 16.4 20.7 1.0
60 BLOWS 16.3 20.4 0.4
PROJECT: SHL 502(1)
SAMPLE NO: PLT-3
LAB NO: E-96-0432
CBR @ 0.2 = 10.0
CBR @ 0.1 = 9.4
CBR @ 0.2 = 6.3
CBR @ 0.1 = 6.2
CBR @ 0.2 = 1.8
CBR @ 0.1 = 1.7
RESISTANCE TO PENETRATION (PSI)
PENETRATION (INCHES)
.025 .050 .075 .100 .150 .200 .250 .300
SOAKED CBR
DRY DENSITY AS MOLDED (PCF)
103 106 109 112 115 118
95% OF MAXIMUM DENSITY
= .95 (117.4 PCF) = 111.5 PCF
CBR @ 0.1 = 7.0
CBR @ 0.2 = 7.2
CBR = 7.2

E-96-0433

U S DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Request for and Report of

SOIL CLASSIFICATION TEST

PROJECT SHIL 502(1) SAMPLE NO. VC-6

SOURCE _____ PAY ITEM NO. _____

MATERIAL TO BE USED FOR _____

SAMPLED BY _____ FROM Depth 0-2.1 DATE 8/29/96

PERSON AUTHORIZING TEST _____ DATE SHIPPED TO LAB _____

INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAB NO.	TEST RESULTS	SPECIFICATION
☒ AMOUNT FINER THAN 0.075 mm	T 11	1/28 MD	E-96-0433	TO BE LISTED ON THE REVERSE SIDE	"
☒ SIEVE ANALYSIS	T 27	1/29 MD	"	TO BE LISTED ON THE REVERSE SIDE	
☒ LIQUID LIMIT	T 89	1/30 MD	"	48 ✓	
☒ PLASTIC LIMIT	T 90	1/30 MD	"	19 ✓	
☒ PLASTIC INDEX	T 90	1/30 MD	"	29 ✓	
☒ CLASSIFICATION	T 317	2/18/97 MD	"	A-7-6(22) ✓	
☐ PARTICLE SIZE BY HYDROMETER	T 88				
☒ OTHER	T 99 C	1/23 MD	E-96-0433	Density: 113.9 ✓ Moisture: 16.3 ✓	
☒ OTHER	T193	MD	"	CBR 5.9 ✓	

REMARKS: Forward original copy to Regional Lab
Forward one copy with sample
Retain one copy in Project records

M. W. Vivier
Marcel W. Vivier
FHWA Materials Engineer

Reported by: Nathaniel Jansen
Name

2/18/97
Date

FORM FHWA 15-99-A 5/76

E-96-0433

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Project: SHIL 502(1) Source:

Where Sampled: Depth 0-2.1 Quantity Represented:

Sample Of: Soil Lot No.: Sample No.: VC-6

Sampled By: Date: 8/29/96 Tested By: [illegible] Date: 1/23/97

Method: T 99C Max. Dry Density: 113.9 Optimum Moisture: 16.3 Specific Gravity:

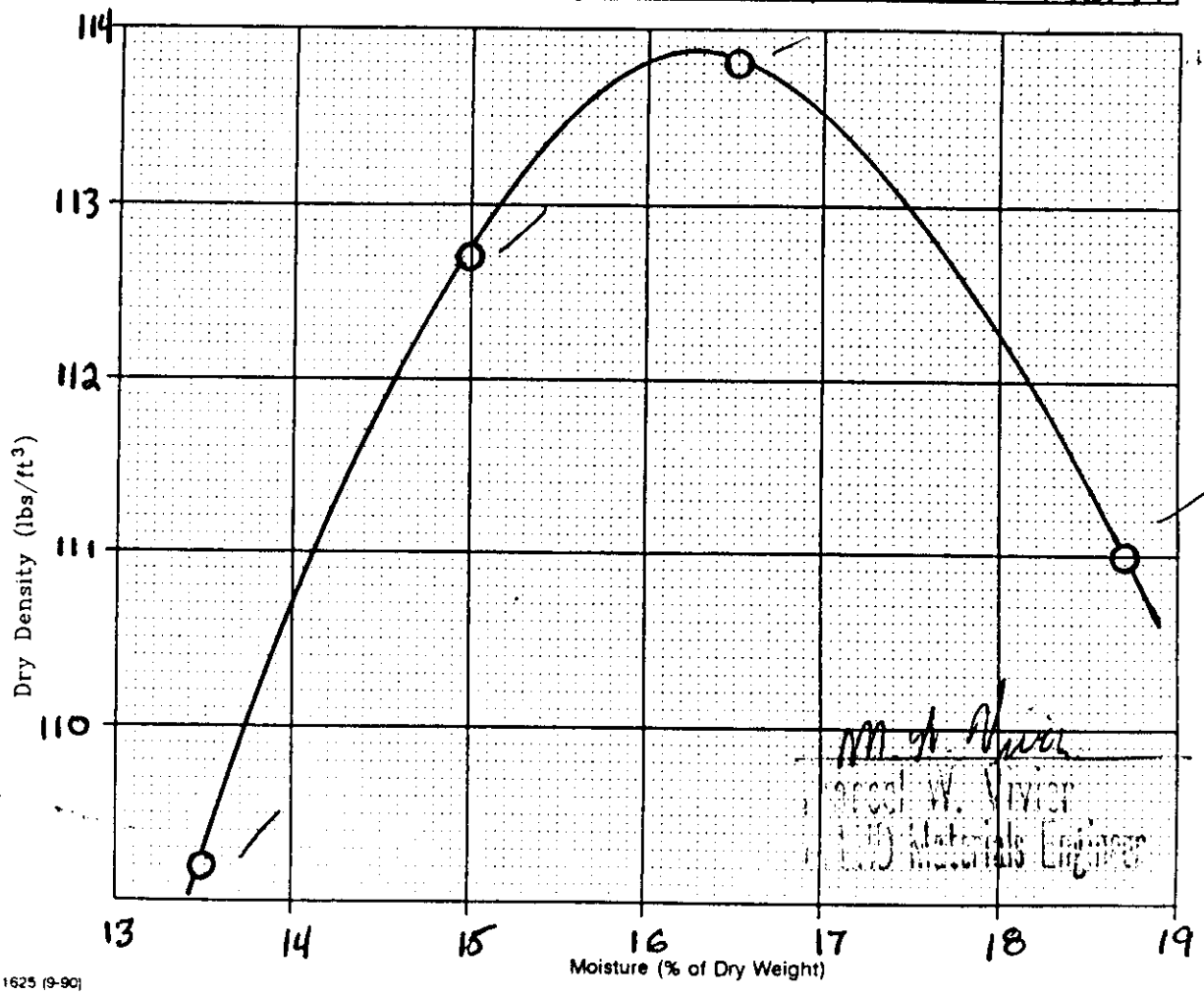
Density Determination

Test No.	1	2	3	4
(a) Wet Soil + Tare	6114	6202	6248	6232
(b) Mold Tare	4242	4242	4242	4242
(c) [a-b] Wet Wt.	4.13	4.32	4.48	4.39
(d) Wet Density (*)c lb/ft³	123.9	129.6	132.6	131.7
Dry Density [d / (1 + .01w)]	109.8	112.7	113.8	111.0

* A constant factor. Use 30.00 for AASHTO T 99 and 13.33 for AASHTO T 180.

Moisture Determination

Pan No.	C	1G	1E	1C
(r) Wet Soil Wt. + Tare	571.0	486.6	450.4	397.3
(s) Dry Soil Wt. + Tare	523.5	442.6	408.4	359.2
(t) Container Tare Wt.	171.1	149.2	154.1	155.9
(u) Dry Soil Wt. [s-t]	352.4	293.4	254.3	203.3
(v) Water Wt. [r-s]	47.5	44.0	42.0	38.1
(w) % Moisture [v/u (100)]	13.5	15.0	16.5	18.7



Form FHWA 1625 (9-90)

E-96-0433

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS
AASHTO T 89 AND AASHTO T 90

Project SHIL 502(1) Source

Where sampled Depth 0-2.1 Quantity represented

Sample of Soil Lot No. Sample No. VC-6

Sampled By: Date: 8/29/96 Tested by Nathaniel Dan Date 1/30/97

TEST - - -	LIQUID LIMIT (%)		PLASTIC LIMIT (%)	
TEST NUMBER - - -	1	2	1	2
No. of blows (liquid limit test)	25	26		
Container No.	A3	A4	A12	A13
A Tare weight of container	15.69	15.42	15.23	15.73
B Weight of wet soil and container	34.35	32.25	19.25	20.14
C Weight of dry soil and container	28.30	26.83	18.60	19.43
D Weight of dry soil [C - A]	12.61	11.41	3.37	3.70
E Weight of moisture [B - C]	6.05	5.42	0.65	0.71
F Percent moisture [$\frac{E}{D}(100)$]	48.0	47.5	19.3	19.2
Liquid Limit[1]	48.0	48.0 47.7		
Plastic Limit[2] [F]			19.3	19.2

G. LIQUID LIMIT (mean) 48.0

H. PLASTIC LIMIT (Mean) 19

PLASTIC INDEX [G - H] 29

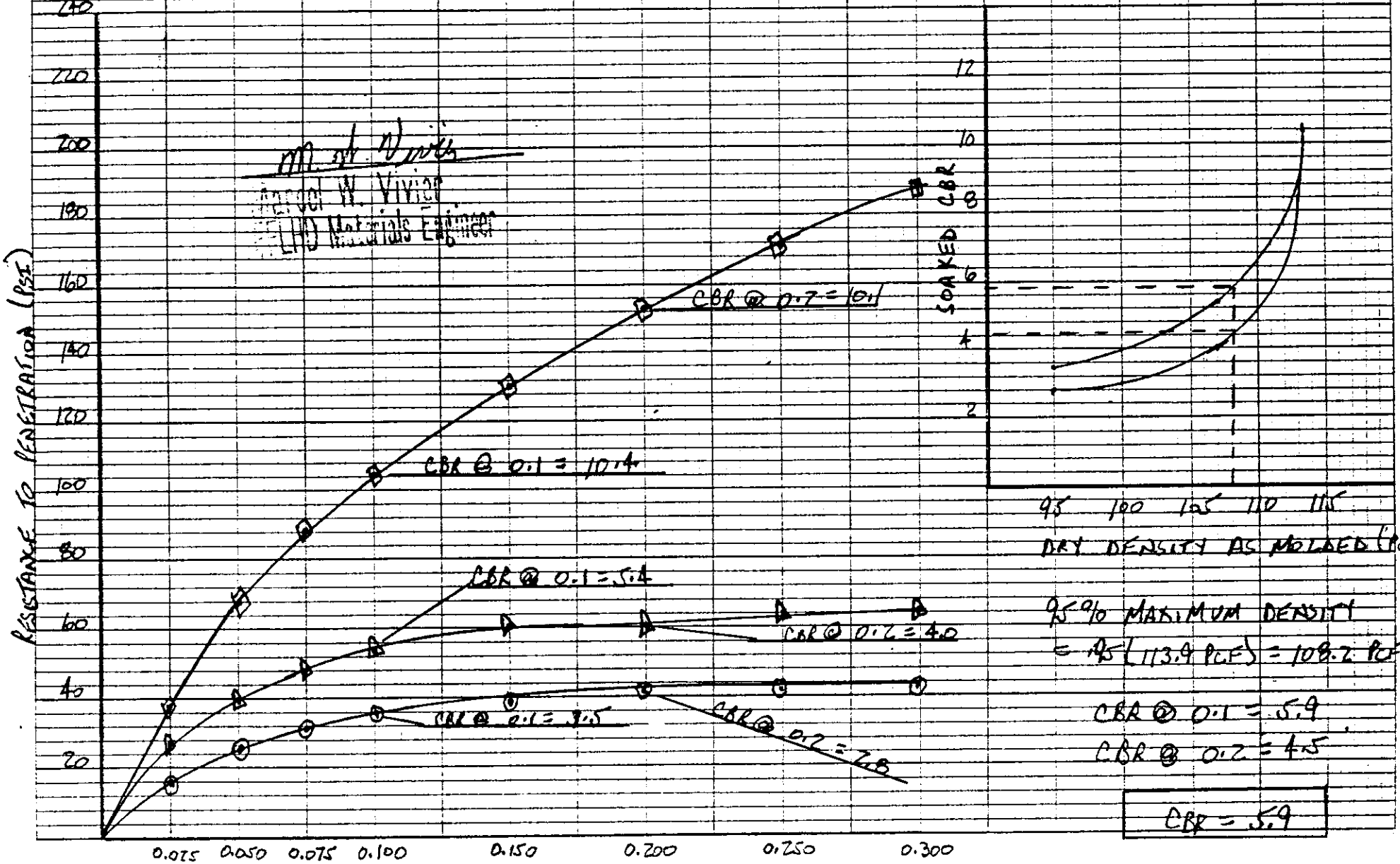
Marcel W. Vivier
FLHD Materials Engineer

[1] Obtained using nomograph chart. See "Precision" statement in AASHTO T 89.
[2] See "Precision" statement in AASHTO T 90.

Form FHWA 1884 (9-88)

PROJECT: SHILL SOIL(1)
SAMPLE NO: VC-6
LAB NO: E-96-0433

	% MOISTURE AS MOLDED	% MOISTURE SOAKED	EXPANSION (%)
○ 10 BLOWS	17.1	21.5	3.6
△ 25 BLOWS	16.9	23.3	1.8
□ 60 BLOWS	17.5	20.0	1.1



Robert W. Vivier
LHD Materials Engineer

95% MAXIMUM DENSITY
= 95% (113.9 PCF) = 108.2 PCF

CBR @ 0.1 = 5.9
CBR @ 0.2 = 4.5

CBR = 5.9

E-96-0434

U S DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Request for and Report of

SOIL CLASSIFICATION TEST

PROJECT SHIL 502(1) SAMPLE NO. R-2

SOURCE _____ PAY ITEM NO. _____

MATERIAL TO BE USED FOR _____

SAMPLED BY _____ FROM _____ DATE 8/29/96

PERSON AUTHORIZING TEST _____ DATE SHIPPED TO LAB _____

INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAB NO.	TEST RESULTS	SPECIFICATION
☒ AMOUNT FINER THAN 0.075 mm	T 11	2/24/97 MD	E-96-0434	TO BE LISTED ON THE REVERSE SIDE	"
☒ SIEVE ANALYSIS	T 27	2/25 MD	"	TO BE LISTED ON THE REVERSE SIDE	
☒ LIQUID LIMIT	T 89	2/24 MD	"	50 ✓	
☒ PLASTIC LIMIT	T 90	2/24 MD	"	24 ✓	
☒ PLASTIC INDEX	T 90	2/24 MD	"	26 ✓	
☒ CLASSIFICATION	T 317	3/3/97 MD	"	A-7-6(7) ✓	
☐ PARTICLE SIZE BY HYDROMETER	T 88				
☒ OTHER	T 99 C	2/24 MD	E-96-0434	Max. Density: 117.6 ✓ opt. moist. 13.8 ✓	
☒ OTHER	T 193	MD	"	CBR 7.5 ✓	

REMARKS: Forward original copy to Regional Lab
Forward one copy with sample
Retain one copy in Project records

M. W. Vivier
Marcel W. Vivier
LHD Materials Engineer

Reported by: Nathanael Dawn
Name

3/4/97
Date

FORM FHWA 15-99-A 5/76

E-96-0434

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Project: SHIL 502(1) Source:

Where Sampled: Quantity Represented:

Sample Of: Soil Lot No.: Sample No.: R-2

Sampled By: Date: 8/29/96 Tested By: Nathaniel Jones Date: 2/24/97

Method: T99 C Max. Dry Density: 117.6 Optimum Moisture: 13.8 Specific Gravity:

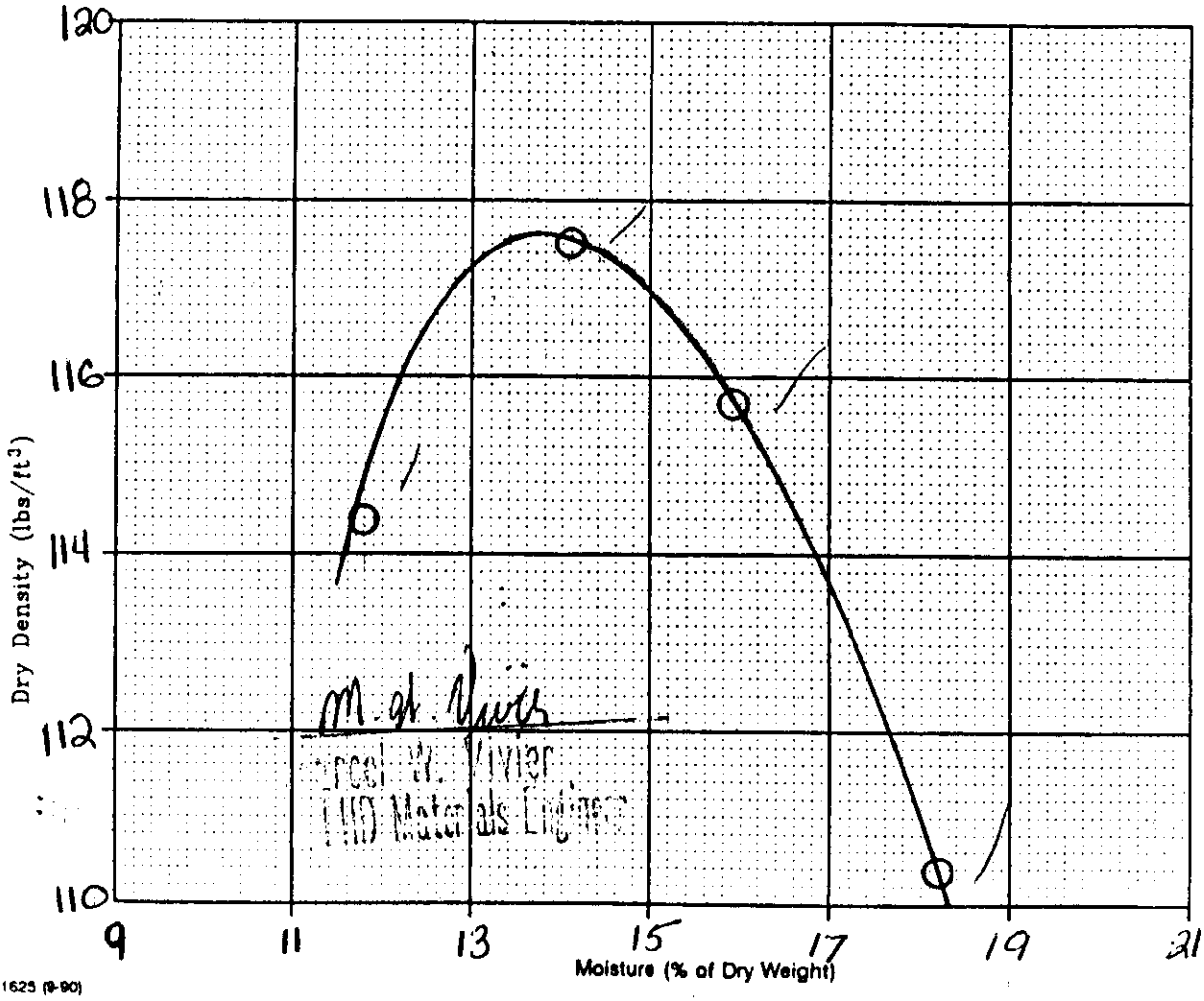
Density Determination

Test No.	1		2		3		4
(a) Wet Soil + Tare	6176		6268		6269		6214
(b) Mold Tare	4242		4242		4242		4242
(c) [a−b] Wet Wt.	4.26		4.47		4.47		4.35
(d) Wet Density (*)c lb/ft³	127.8		134.1		134.1		130.5
Dry Density [d / (1 + w/100)]	114.43		117.5		115.7		110.4

* A constant factor. Use 30.00 for AASHTO T 99 and 13.33 for AASHTO T 180.

Moisture Determination

Pan No.	1E		C		1G		1C
(r) Wet Soil Wt. + Tare	671.9		677.0		515.7		617.5
(s) Dry Soil Wt. + Tare	617.3		526.9		465.3		546.3
(t) Container Tare Wt.	154.8		171.2		149.1		155.9
(u) Dry Soil Wt. [s−t]	483.1		355.7		316.2		390.4
(v) Water Wt. [r−s]	54.6		50.1		50.4		71.2
(w) % Moisture [v/u (100)]	11.8		14.1		15.9		18.2



Form FHWA 1625 (9-90)

E-96-0434

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

Project SHIL 502(1) Source _____

Where sampled _____ Quantity represented _____

Sample of Soil Lot No. _____ Sample No. R-2

Sampled By: _____ Date: 8/29/96 Tested by [signature] Date 2/24/97

TEST - - -	LIQUID LIMIT (%)		PLASTIC LIMIT (%)	
TEST NUMBER - - -	1	2	1	2
No. of blows (liquid limit test)	20	22		
Container No.	A1	A10	A6	A12
A Tare weight of container	15.28	15.55	15.43	15.24
B Weight of wet soil and container	33.35	33.21	18.87	19.09
C Weight of dry soil and container	27.22	27.27	18.24	18.31
D Weight of dry soil [C - A]	11.94	11.72	2.81	3.07
E Weight of moisture [B - C]	6.13	5.94	0.63	0.78
F Percent moisture [$\frac{E}{D}(100)$]	51.3	50.7	22.4	25.4
Liquid Limit[1]	50.0	49.9		
Plastic Limit[2] [F]			22.4	25.4

G. LIQUID LIMIT (mean) 50

H. PLASTIC LIMIT (Mean) 24

PLASTIC INDEX (G - H) 26

M. N. Vivier
Marcel N. Vivier
FHWA Materials Engineer

[1] Obtained using nomograph chart. See "Precision" statement in AASHTO T 89.
[2] See "Precision" statement in AASHTO T 90.

PROJECT : SHIL 502(1)
SAMPLE NO : R-2
LAB NO : E-96-0434

	% MOISTURE AS MOLDED	% MOISTURE SOAKED	EXPANSION (%)
● 10 BLOWS	13.9	23.9	1.7
▲ 25 BLOWS	14.0	21.0	1.7
⊡ 60 BLOWS	14.2	14.2	1.4

RESISTANCE TO PENETRATION (PSI)

220
200
180
160
140
120
100
80
60
40
20

CBR @ 0.2 = 11.9
CBR @ 0.1 = 13.8
CBR @ 0.2 = 6.0
CBR @ 0.1 = 5.0
CBR @ 0.2 = 1.7
CBR @ 0.1 = 1.2

0.025 0.050 0.075 0.100 0.150 0.200 0.250 0.300

PENETRATION (INCHES)

SOAKED CBR

15
10
5

95 100 105 110 115 120

DRY DENSITY AS MOLDED

95% OF MAXIMUM DENSITY
= .95 (117.6 PCF) = 111.7 PCF

CBR @ 0.1 = 7.0
CBR @ 0.2 = 7.5

CBR = 7.5

E-96-0435

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Request for and Report of

SOIL CLASSIFICATION TEST

PROJECT SHIL 502(1) SAMPLE NO. RS-3

SOURCE _____ PAY ITEM NO. _____

MATERIAL TO BE USED FOR _____

SAMPLED BY _____ FROM Depth: 0-1.8 DATE 10/18/96

PERSON AUTHORIZING TEST _____ DATE SHIPPED TO LAB 12/26/97

INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAB NO.	TEST RESULTS	SPECIFICATION
☒ AMOUNT FINER THAN 0.075 mm	T 11	1/16	E-96-0435	TO BE LISTED ON THE REVERSE SIDE	"
☒ SIEVE ANALYSIS	T 27	1/17	"	TO BE LISTED ON THE REVERSE SIDE	
☒ LIQUID LIMIT	T 89	1/18	"	29 ✓	
☒ PLASTIC LIMIT	T 90	1/18	"	18 ✓	
☒ PLASTIC INDEX	T 90	1/18	"	11 ✓	
☒ CLASSIFICATION	T 317	1/22	"	A-6(8) ✓	
☐ PARTICLE SIZE BY HYDROMETER	T 88				
☒ OTHER	T 99 C	1/18	E-96-0435	Max! Density 115.3 % Moist 15.8 ✓	
☒ OTHER	T 193	1/13	"	CBR 7.8 ✓	

REMARKS: Forward original copy to Regional Lab
Forward one copy with sample
Retain one copy in Project records

M. W. Vivier
Marcel W. Vivier
FHWA Materials Engineer

Reported by: Nathaniel Dame
Name

1/22/97
Date

FORM FHWA 15-99-A 5/76

E-96-0435

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Project: SHL 502(1) Source:

Where Sampled: Quantity Represented:

Sample Of: Lot No.: Sample No.: RS-3

Sampled By: Date: 10/18/96 Tested By: Date: 1/6/97

Method: T99C Max. Dry Density: 115.3 Optimum Moisture: 15.8% Specific Gravity:

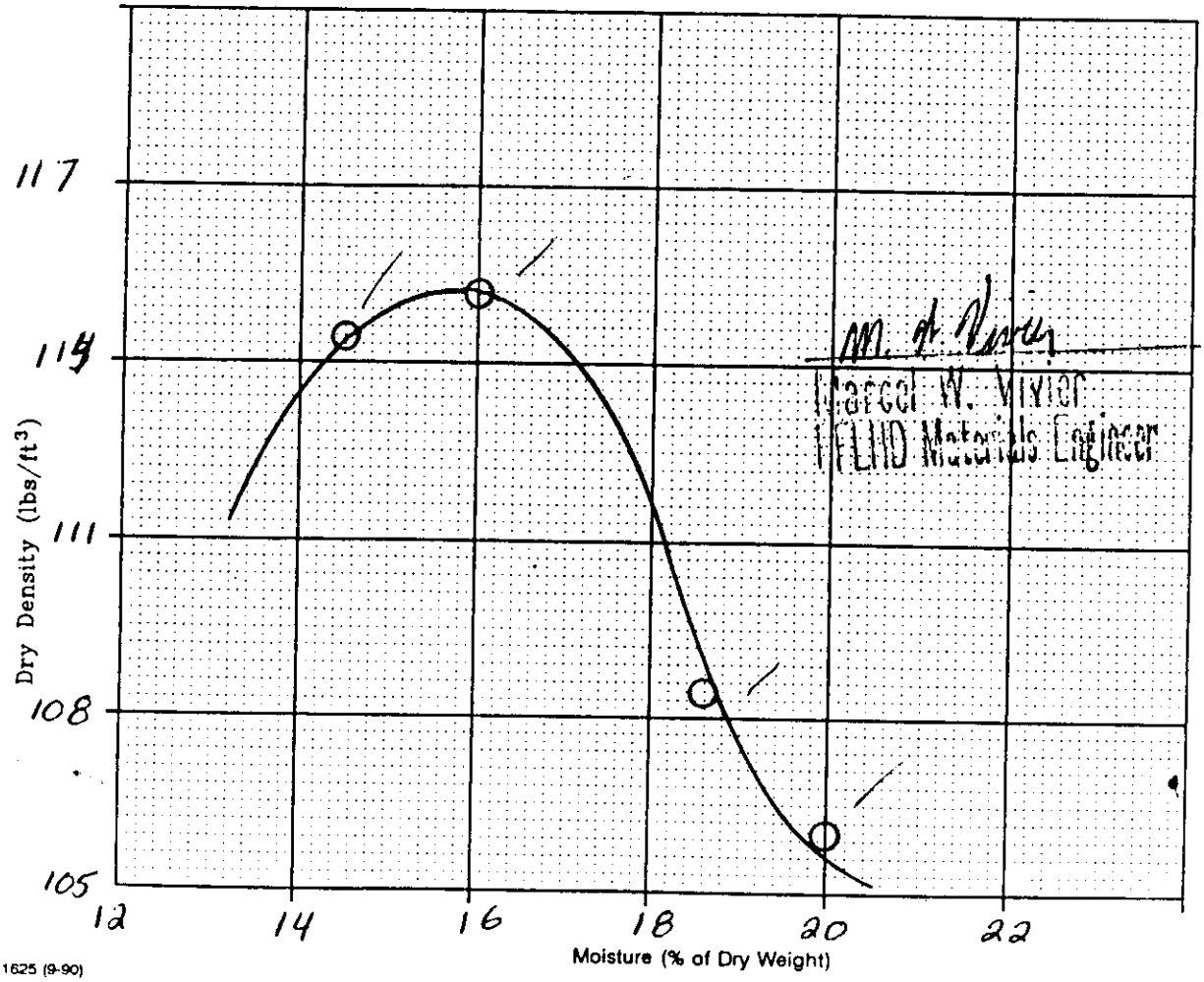
Density Determination

Test No.	A	B	C	D
(a) Wet Soil + Tare	6226	6263	6188	6164
(b) Mold Tare	4242	4242	4242	4242
(c) [a−b] Wet Wt.	4.37	4.46	4.29	4.24
(d) Wet Density (*)c lb/ft³	131.1	133.8	128.7	127.2
Dry Density [$\frac{d}{1 + .01w}$]	114.5	115.3	108.5	106.0

* A constant factor. Use 30.00 for AASHTO T 99 and 13.33 for AASHTO T 180.

Moisture Determination

Pan No.	1G	1E	1C	1A
(r) Wet Soil Wt. + Tare	633.1	767.6	584.5	650.9
(s) Dry Soil Wt. + Tare	571.8	683.0	517.2	567.2
(t) Container Tare Wt.	149.2	154.2	155.9	149.3
(u) Dry Soil Wt. [s−t]	422.6	528.8	361.3	417.9
(v) Water Wt. [r−s]	61.3	84.6	67.3	83.7
(w) % Moisture [$\frac{v}{u}$ (100)]	14.5	16.0	18.6	20.0



Marcel N. Vivier
FHWA Materials Engineer

Form FHWA 1625 (9-90)

E-96-0435

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

Project SHIL 502(1) Source

Where sampled Quantity represented

Sample of Lot No. Sample No. RS-3

Sampled By: Date: 10/18/96 Tested by [signature] Date 1/8/97

TEST - - -	LIQUID LIMIT (%)		PLASTIC LIMIT (%)	
TEST NUMBER - - -	1	2	1	2
No. of blows (liquid limit test)	22	30		
Container No.	A4	A1	A10	A11
A Tare weight of container	15,45	15,28	15,54	15,09
B Weight of wet soil and container	30,39	31.94	20,22	19,37
C Weight of dry soil and container	26,97	28,20	19,53	18,70
D Weight of dry soil [C - A]	11,52	12,92	3,99	3,61
E Weight of moisture [B - C]	3,42	3,74	0,69	0,67
F Percent moisture [$\frac{E}{D}(100)$]	29,7	28.9	17,3	18,6
Liquid Limit[1]	29,3	29,5		
Plastic Limit[2] [F]			17,3	18,6

G. LIQUID LIMIT (mean) 29

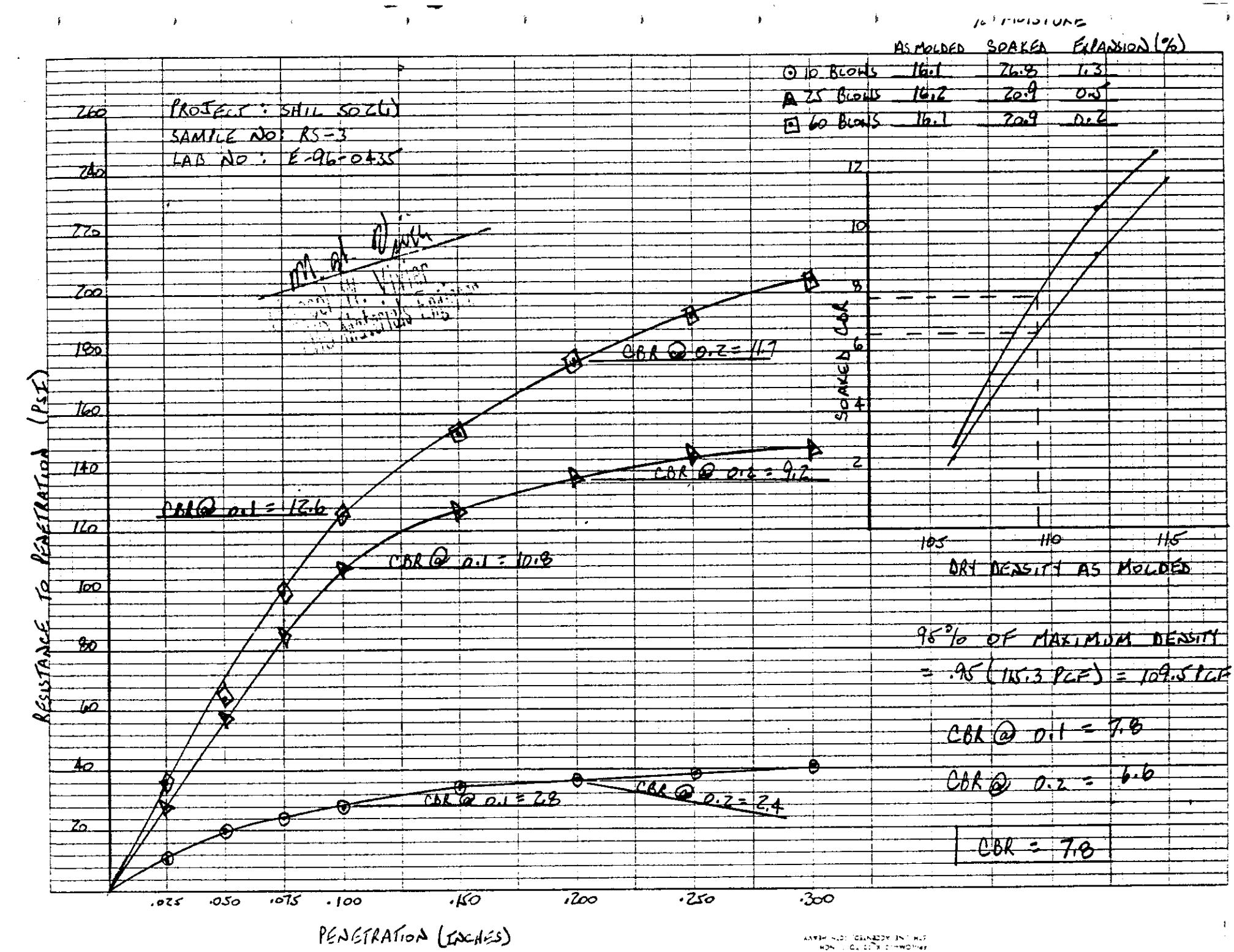
H. PLASTIC LIMIT (Mean) 18

PLASTIC INDEX [G - H] 11

M. of Vivier
Marcel W. Vivier
FLHD Materials Engineer

[1] Obtained using nomograph chart. See "Precision" statement in AASHTO T 89.
[2] See "Precision" statement in AASHTO T 90.

Form FHWA 1884 (9-82)


PROJECT: SHIL SOIL(S)
SAMPLE NO: RS-3
LAB NO: E-96-0435
% MOISTURE
AS MOLDED SOAKED EXPANSION (%)
10 BLOWS 16.1 26.8 1.3
25 BLOWS 16.2 20.9 0.5
60 BLOWS 16.1 20.9 0.2
CBR @ 0.1 = 12.6
CBR @ 0.2 = 11.7
CBR @ 0.1 = 10.8
CBR @ 0.2 = 9.2
CBR @ 0.1 = 2.8
CBR @ 0.2 = 2.4
RESISTANCE TO PENETRATION (PSI)
PENETRATION (INCHES)
SOAKED CBR
DRY DENSITY AS MOLDED
95% OF MAXIMUM DENSITY
= .95 (115.3 PCF) = 109.5 PCF
CBR @ 0.1 = 7.8
CBR @ 0.2 = 6.6
CBR = 7.8

E-96-0436

U S DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Request for and Report of

SOIL CLASSIFICATION TEST

PROJECT SHIL 502(1) SAMPLE NO. T-4

SOURCE _____ PAY ITEM NO. _____

MATERIAL TO BE USED FOR _____

SAMPLED BY _____ FROM _____ DATE 8/29/96

PERSON AUTHORIZING TEST _____ DATE SHIPPED TO LAB _____

INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAB NO.	TEST RESULTS	SPECIFICATION
☒ AMOUNT FINER THAN 0.075 mm	T 11	2/24 MJ	E-96-0436	TO BE LISTED ON THE REVERSE SIDE	
☒ SIEVE ANALYSIS	T 27	2/25 MJ	"	TO BE LISTED ON THE REVERSE SIDE	
☒ LIQUID LIMIT	T 89	2/23 MJ	"	31	✓
☒ PLASTIC LIMIT	T 90	2/23 MJ	"	18	✓
☒ PLASTIC INDEX	T 90	2/23 MJ	"	13	✓
☒ CLASSIFICATION	T 317	2/26 MJ	"	A-7-6(8)	
☐ PARTICLE SIZE BY HYDROMETER	T 88				
☒ OTHER	T 99 C	2/11 MJ	E-96-0436	Max Den: 123.3 ✓ % moist: 11.3 ✓	
☒ OTHER	T193	2/23 MJ	"	CBR 6.5 ✓	

REMARKS: Forward original copy to Regional Lab
Forward one copy with sample
Retain one copy in Project records

M. W. Vivier

Marcel W. Vivier
FHWA Materials Engineer

Reported by: Nathaniel Jones
Name

2/26/97
Date

FORM FHWA 15-99-A 5/76

E-96-0436

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Project: SHIL 502(1) Source:

Where Sampled: Quantity Represented:

Sample Of: Soil Lot No.: Sample No.: T-4

Sampled By: Date: 8/29/96 Tested By: Date: 2/11/97

Method: T 99C Max. Dry Density: 123.3 Optimum Moisture: 11.3 Specific Gravity:

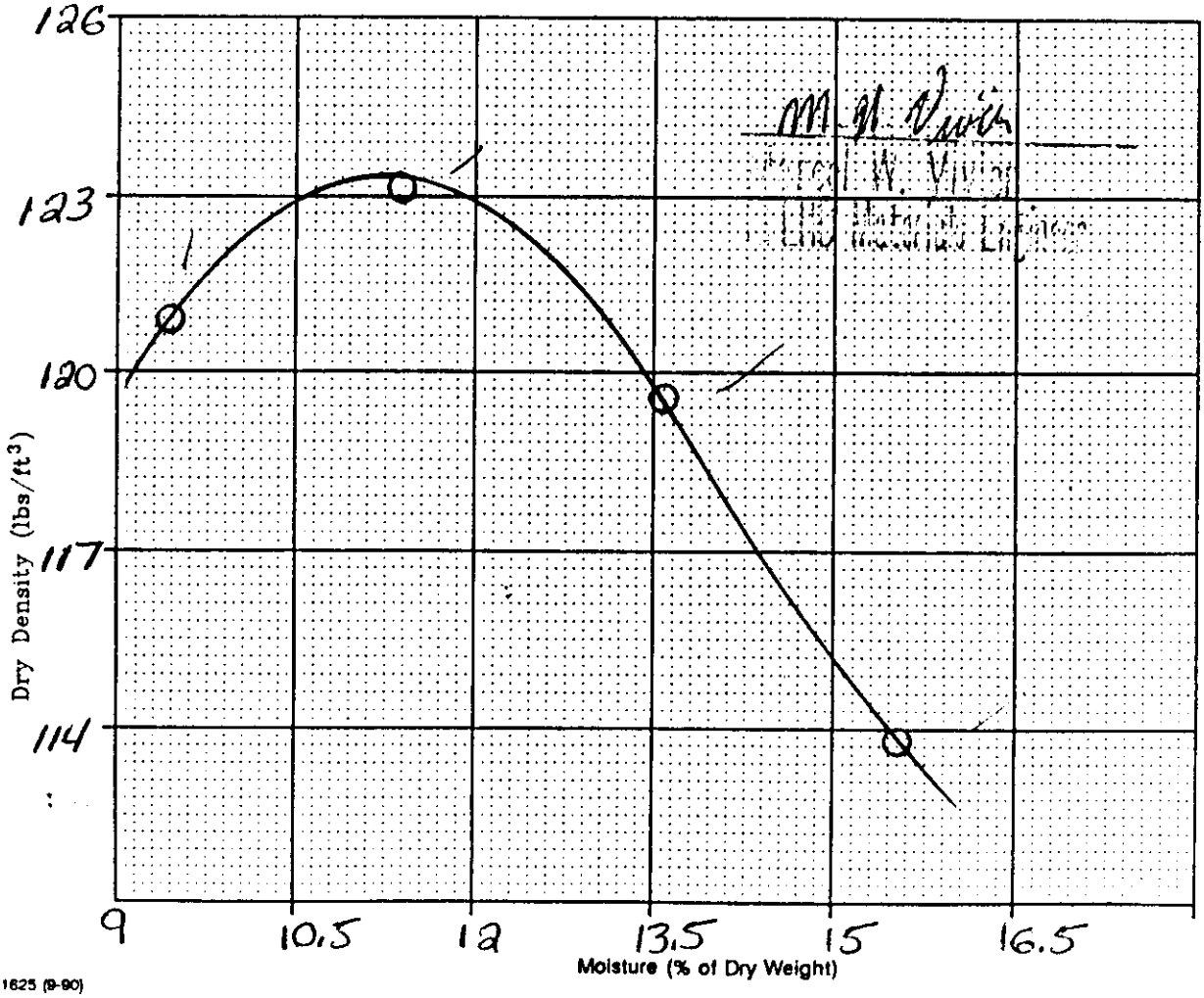
Density Determination

Test No.	1		2		3		4
(a) Wet Soil + Tare	6235		6315		6298		6229
(b) Mold Tare	4241		4241		4241		4241
(c) [a−b] Wet Wt.	4.40		4.57		4.53		4.38
(d) Wet Density (*)c lb/ft³	132.0		137.1		135.9		131.4
Dry Density [$\frac{d}{1 + \frac{c}{33}w}$]	120.8		123.1		119.6		113.8

* A constant factor. Use 30.00 for AASHTO T 99 and 13.33 for AASHTO T 180.

Moisture Determination

Pan No.	A		1E		1G		K
(r) Wet Soil Wt. + Tare	638.3		535.6		512.5		542.2
(s) Dry Soil Wt. + Tare	598.7		496.6		469.0		480.3
(t) Container Tare Wt.	173.0		154.3		149.1		155.8
(u) Dry Soil Wt. [s−t]	425.7		342.3		319.9		334.5
(v) Water Wt. [r−s]	39.6		39.0		43.5		61.9
(w) % Moisture [$\frac{v}{u}$ (100)]	9.3		11.4		13.6		15.5



Form FHWA 1625 (9-90)

E-96-0436

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

Project SHIL 502(1) Source

Where sampled Quantity represented

Sample of Soil Lot No. Sample No. T-4

Sampled By: Date: 8/29/96 Tested by [signature] Date 2/23/97

TEST - - -	LIQUID LIMIT (%)		PLASTIC LIMIT (%)	
TEST NUMBER - - -	1	2	1	2
No. of blows (liquid limit test)	20	23		
Container No.	A4	A11	A6	A1
A Tare weight of container	15.42	15.09	15.42	15.28
B Weight of wet soil and container	38.55	38.19	20.89	19.39
C Weight of dry soil and container	33.01	32.73	19.54	18.75
D Weight of dry soil [C - A]	17.59	17.64	4.12	3.47
E Weight of moisture [B - C]	5.54	5.46	0.75	0.64
F Percent moisture $[\frac{E}{D}(100)]$	31.5	31.0	18.2	18.4
Liquid Limit[1]	30.7	30.7		
Plastic Limit[2] [F]			18.2	18.4

G. LIQUID LIMIT (mean) 31

H. PLASTIC LIMIT (Mean) 18

PLASTIC INDEX [G - H] 13

[1] Obtained using nomograph chart. See "Precision" statement in AASHTO T 89.
[2] See "Precision" statement in AASHTO T 90.

[signature]
Marcel W. Vivier
FHWA Materials Engineer

Form FHWA 1884 (9-88)

PROJECT: SHIL 502(1)
SAMPLE: T-4
LAB. NO: E-96-0436

	% Moisture As Molded	% Moisture Soaked	Expansion (%)
⊡ 10 BLOWS	11.4	21.0	1.2
⊙ 25 BLOWS	11.6	17.8	0.8
△ 60 BLOWS	11.4	16.0	0.8

Marcel W. Wright
Marcel W. Wright
Lead Materials Engineer

CORRECTED CBR @ .2 = 12.3
CORRECTED CBR @ .1 = 14.0
CBR @ .2 = 4.3
CBR @ .1 = 6.0
CBR @ .1 = 1.4
CBR @ .2 = 1.3

PENETRATION (INCHES)

SOAKED CBR

DRY DENSITY AS MOLDED

95% MAXIMUM DENSITY
= .95 (123.3 PCF) = 117.1 PCF

CBR @ 0.1 = 6.5
CBR @ 0.2 = 5.0

CBR = 6.5

E-96-0437

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Request for and Report of

SOIL CLASSIFICATION TEST

PROJECT SHIL 500(1) SAMPLE NO. BL-3

SOURCE _____ PAY ITEM NO. _____

MATERIAL TO BE USED FOR _____

SAMPLED BY _____ FROM _____ DATE 8/29/96

PERSON AUTHORIZING TEST _____ DATE SHIPPED TO LAB _____

INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAB NO.	TEST RESULTS	SPECIFICATION
☒ AMOUNT FINER THAN 0.075 mm	T 11	2/17/97 ZG	E-96-0437	TO BE LISTED ON THE REVERSE SIDE	
☒ SIEVE ANALYSIS	T 27	2/18 ZG	"	TO BE LISTED ON THE REVERSE SIDE	
☒ LIQUID LIMIT	T 89	2/18 ZG	"	25 ✓	
☒ PLASTIC LIMIT	T 90	2/18 ZG	"	19 ✓	
☒ PLASTIC INDEX	T 90	2/18 ZG	"	6 ✓	
☒ CLASSIFICATION	T 317	2/24 ZG	"	A-4(1) ✓	
☐ PARTICLE SIZE BY HYDROMETER	T 88				
☒ OTHER T 99 C		2/19 ZG	E-96-0437	Max. Dens. 121.4 ✓ opt. Moist. 10.7 ✓	
☒ OTHER		2/20 ZG	"	CBR 10.7 ✓	

REMARKS: Forward original copy to Regional Lab
Forward one copy with sample
Retain one copy in Project records

M. W. Vivier
Marcel W. Vivier
FHWA Materials Engineer

Reported by: Nathaniel Dawson
Name

2/24/97
Date

FORM FHWA 15-99-A 5/76

E-96-0437

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Project: SHL 500(1) Source:

Where Sampled: Quantity Represented:

Sample Of: SOIL Lot No.: Sample No.: BL-3

Sampled By: Date: 8/29/96 Tested By: Jathonael Dana Date: 1/29/97

Method: T 99 C Max. Dry Density: 121.4 Optimum Moisture: 10.7 Specific Gravity:

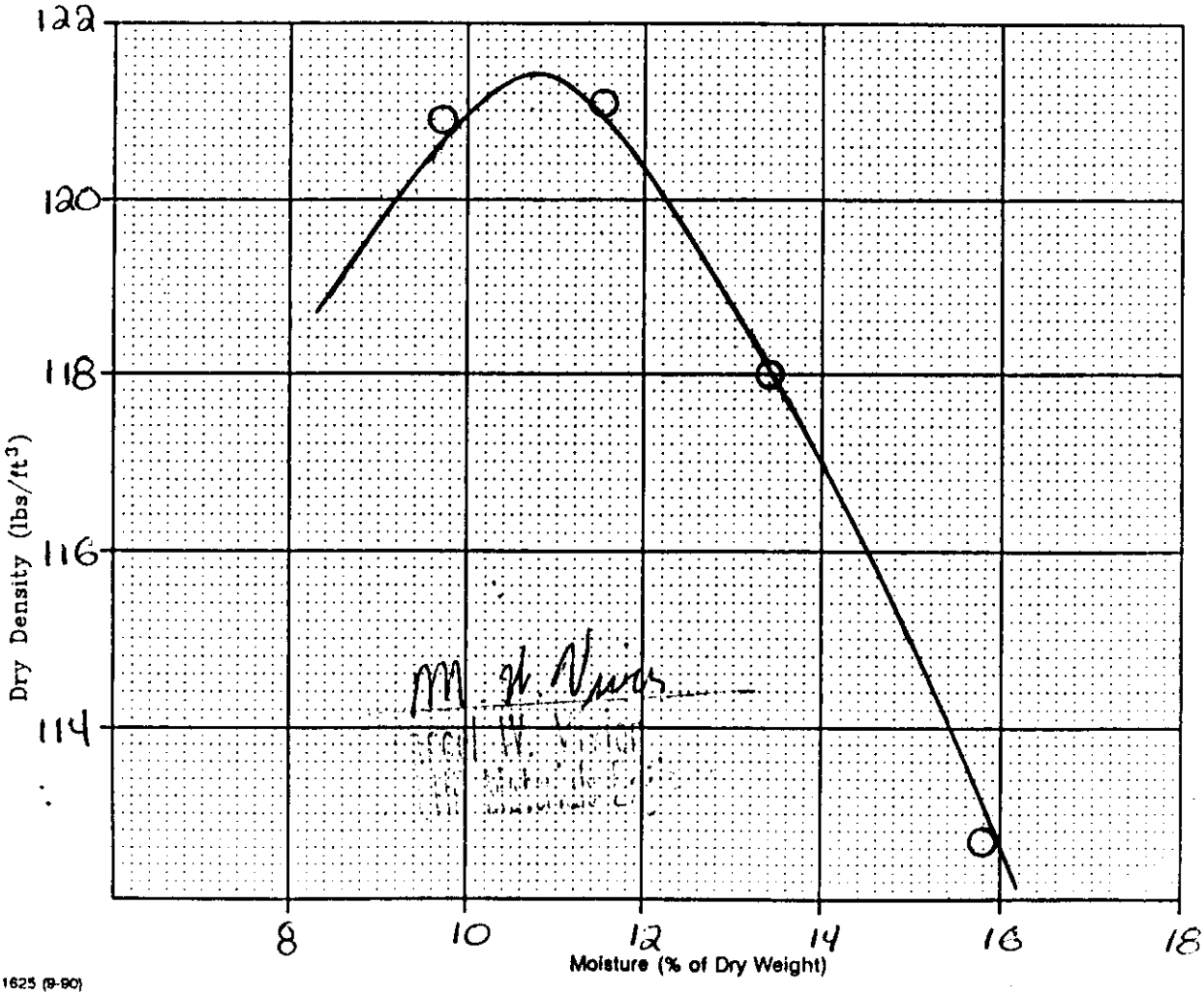
Density Determination

Test No.	A		B		C		D
(a) Wet Soil + Tare	6249		6281		6263		6217
(b) Mold Tare	4242		4242		4242		4242
(c) [a−b] Wet Wt.	4.42		4.50		4.46		4.35
(d) Wet Density (*)c lb/ft³	132.6		135.0		133.8		130.5
Dry Density [d / (1 + .01w)]	120.9		121.1		118.0		112.7

* A constant factor. Use 30.00 for AASHTO T 99 and 13.33 for AASHTO T 180.

Moisture Determination

Pan No.	C		A		B		E
(r) Wet Soil Wt. + Tare	608.4		553.9		623.6		657.1
(s) Dry Soil Wt. + Tare	569.8		519.7		575.1		576.9
(t) Container Tare Wt.	171.1		221.4		213.6		208.5
(u) Dry Soil Wt. [s−t]	398.7		298.3		361.5		387.4
(v) Water Wt. [r−s]	38.6		34.2		48.5		61.2
(w) % Moisture [v/u (100)]	9.7		11.5		13.4		15.8



Form FHWA 1625 (9-90)

E-96-0437

U.S. Department of Transportation
Federal Highway Administration
Federal Lands Highway Office

WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS
AASHTO T 89 AND AASHTO T 90

Project SHIL 500(1) Source

Where sampled Quantity represented

Sample of SOIL Lot No. Sample No. BL-3

Sampled By: Date: 8/29/96 Tested by Nathaniel Date 2/18/97

TEST - - -	LIQUID LIMIT (%)		PLASTIC LIMIT (%)	
TEST NUMBER - - -	1	2	1	2
No. of blows (liquid limit test)	27	30		
Container No.	A1	A10	A13	A4
A Tare weight of container	15.30	15.54	15.74	15.42
B Weight of wet soil and container	39.29	37.09	20.37	20.11
C Weight of dry soil and container	34.53	32.82	19.58	19.41
D Weight of dry soil [C - A]	19.23	17.28	3.84	3.99
E Weight of moisture [B - C]	4.76	4.27	0.79	0.70
F Percent moisture $[\frac{E}{D}(100)]$	24.8	24.7	20.6	17.5
Liquid Limit[1]	25.0	25.2		
Plastic Limit[2] [F]			20.6	17.5

G. LIQUID LIMIT (mean) 25

H. PLASTIC LIMIT (Mean) 19

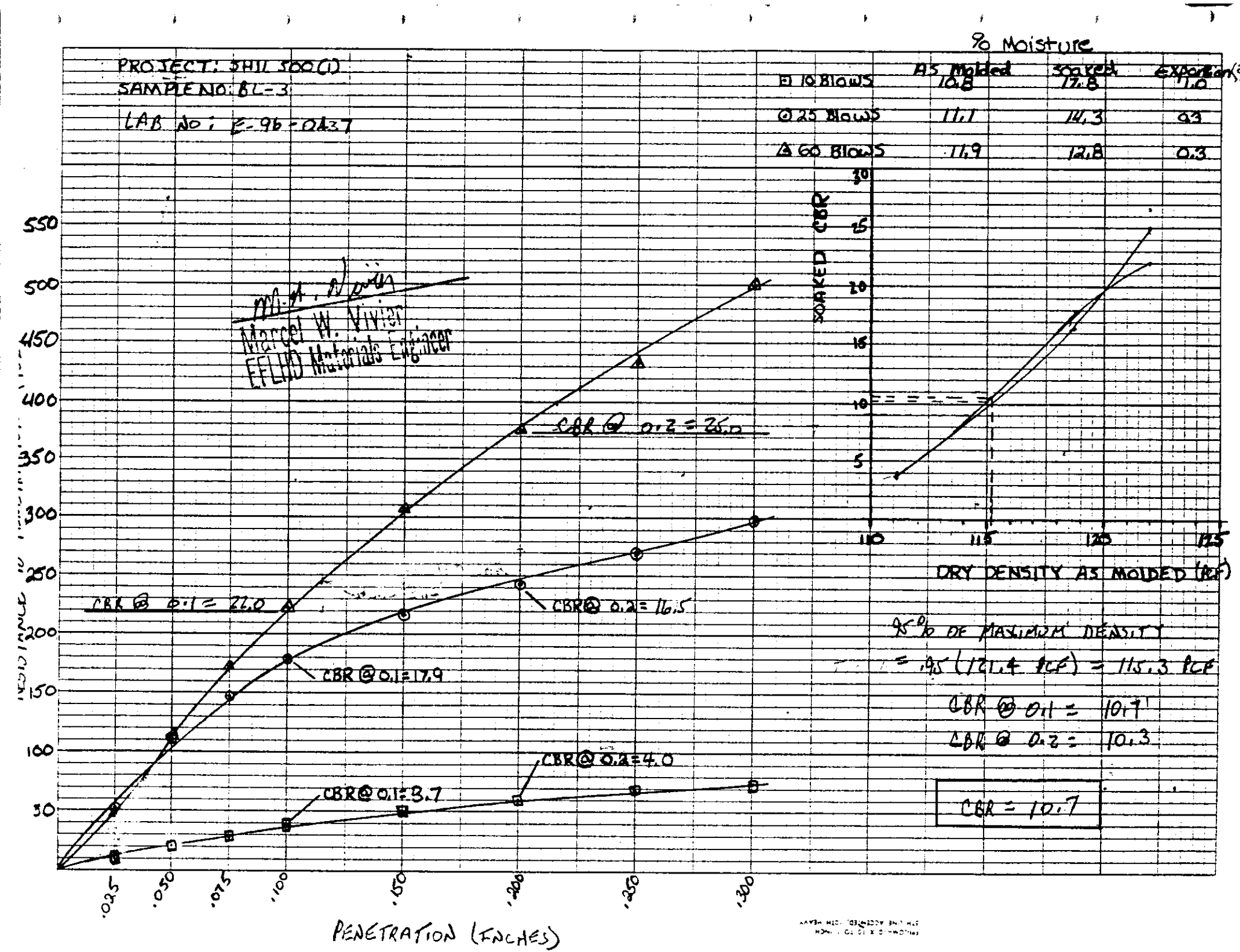
PLASTIC INDEX [G - H] 6

[1] Obtained using nomograph chart. See "Precision" statement in AASHTO T 89.
[2] See "Precision" statement in AASHTO T 90.

Form FHWA 1884 (8-80)

PROJECT: SHIL 500(1)
SAMPLE NO: BL-3
LAB No: E-96-0437

	% Moisture As Molded	% Moisture Soaked	Expansion (%)
⊡ 10 Blows	10.8	12.8	1.0
○ 25 Blows	11.1	14.3	0.3
△ 60 Blows	11.9	12.8	0.3



Mohammad Nowais
Marcel W. Vivier
EFLHD Materials Engineer

95% OF MAXIMUM DENSITY
= .95 (121.4 PCF) = 115.3 PCF

CBR @ 0.1 = 10.7
CBR @ 0.2 = 10.3

CBR = 10.7

APPENDIX E - Boring Summary

TABLE E-1 SUMMARY OF PAVEMENT BORINGS
PITTSBURG LANDING ROAD I

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
PLI-1	90	40	A-6 (11)
PLI-2	90	90	Silty Clay
PLI-3	110	120	Clay
PLI-4	90	120	Sandy Clay
PLI-5	90	120	A-6 (3)
PLI-6	90	120	
PLI-7	70	120	
PLI-8	90	70	
PLI-9	--	--	Silty Clay
PLI-10	--	--	A-6 (12)
PLI-11	--	--	A-6 (13)
PLI-12	110	70	

TABLE E-2 SUMMARY OF PAVEMENT BORINGS
PITTSBURG LANDING ROAD II

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
PLII-1	90	70	A-6 (11)
PLII-2	70	120	Clay
PLII-3	?	?	A-2-4 (0)

TABLE E-3 SUMMARY OF PAVEMENT BORINGS
ENTRANCE ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
E-1	30	130	A-6 (16)
E-2	40	40	A-7-6 (17)

TABLE E-4 SUMMARY OF PAVEMENT BORINGS
SERVICE ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
S-1	90	100	A-7-6 (25)

TABLE E-5 SUMMARY OF PAVEMENT BORINGS
VISITOR CENTER PARKING

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
VC-1	100	140	A-6 (13)
VC-2	80	220	Clay
VC-3	90	90	A-6 (9)
VC-4	70	150	Silty Clay
VC-5	100	110	A-6 (18)
VC-6	130	80	Clay

TABLE E-6 SUMMARY OF PAVEMENT BORINGS
CORINTH-PITTSBURG LANDING ROAD

Boring	Concrete Thickness (mm)	AC Thickness (mm)	Subgrade
CP-1	160	--	A-6 (13)
CP-2	130	--	Silty Clay
CP-3	160	--	A-6 (10)
CP-4	130	--	Silty Clay
CP-5	130	--	A-6 (13)
CP-6	120	--	Silty Clay
CP-7	120	70	A-4 (0)
CP-8	150	30	A-2-4 (0)
CP-9	130	90	A-4 (0)
CP-10	130	--	A-6 (14)
CP-11	130	--	A-6 (1)

Boring	Concrete Thickness (mm)	AC Thickness (mm)	Subgrade
CP-12	120	--	Silty Clay

TABLE E-7 SUMMARY OF PAVEMENT BORINGS
MCCLERNAND ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
MS-1	80	None	A-6 (13)
MS-2	80	None	Silty Clay
MS-3	30	None	A-6 (17)
MS-4	None	None	A-6 (17)
MS-5	100	None	Silty Clay

TABLE E-8 SUMMARY OF PAVEMENT BORINGS
RECONNOITERING ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
R-1	80	70	A-7-6 (18)
R-2	?	?	Silty Clay
R-3	80	60	A-7-6 (23)

TABLE E-9 SUMMARY OF PAVEMENT BORINGS
RHEA SPRINGS ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
RS-1	80	None	A-6 (4)
RS-2	120	None	A-7-6 (20)
RS-3	--	None	Silty Clay
RS-4	130	140	
RS-5	160	140	
RS-6	70	None	

TABLE E-10 SUMMARY OF PAVEMENT BORINGS
EASTERN CORINTH ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
EC-1	110	140	A-6 (15)
EC-2	90	100	Silty Clay
EC-3	100	130	A-7-6 (16)

TABLE E-11 SUMMARY OF PAVEMENT BORINGS
TH PARKING

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
T-1	90	None	
T-2	90	None	
T-3	--	--	A-6 (15)
T-4	--	--	Silty Clay

TABLE E-12 SUMMARY OF PAVEMENT BORINGS
HAMBURG-SAVANNAH ROADS

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
J-1	--	--	A-4 (0)
J-2	90	None	
J-3	70	None	

TABLE -13 SUMMARY OF PAVEMENT BORINGS
PEACH ORCHARD PARKING LOT

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
PO-1	70	None	A-6 (17)
PO-2	60	None	Silty Clay

TABLE E-14 SUMMARY OF PAVEMENT BORINGS
BLOODY POND TOUR STOP

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
BP-1	90	None	A-4 (1)
BP-2	60	None	A-6 (7)

TABLE E-15 SUMMARY OF PAVEMENT BORINGS
BROWN'S LANDING ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
BL-1	--	--	A-2-4 (0)
BL-2	--	--	A-6 (9)
BL-3	--	--	Silty Clay
BL-4	--	--	A-6 (11)
BL-5	--	--	A-6 (15)

TABLE X-16 SUMMARY OF PAVEMENT BORINGS
VISTA

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
V-1	--	--	A-4(1)

TABLE X-17 SUMMARY OF PAVEMENT BORINGS
HAMBURG-SAVANNAH ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
HS-1	60	None	Silty Clay
HS-2	80	None	Clay
HS-3	70	None	Silty Clay
HS-4	90	None	Silty Clay

APPENDIX F - RPCC Pavement Condition Survey

TABLE 1 - RPCC PAVEMENT CONDITION SURVEY RESULTS AND RECOMMENDATIONS CORINTH - PITTSBURG ROAD

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
L1	2M		L45	1H	
L3	1H, 3L		L46	2H	Fix 2' at 45/46 on 46 side
L4	1L, 3L		L48		Exposed reinforcement near 48/49
L5	1M		L50	1H	
L7	1H	+ Blow out	L54	1H	
L8	1M		L56/57		Corner crack & spalling 2'
L9	1H		L57	1M	
L10	1H	+ a pothole	L60	1H	
L12	1H	+ 2 potholes	L65	1H	
L14	2H	At the corner	L66	1H	
L19	1H	+ potholes & 3M	L73	2H	Fix 1.5' at 73/74 on 73 side
L19/20, R19/20	2H	Fix 4' either side of joint.	L74	1H	
L21, R21	2H	Fix 2' at edge 20/21 either side of joint	L75	1H	2 cracks
L21/L22	3M	Fix 3' either side.	L76	1H	
L22/L23	3M, 3L	Fix 6' either side.	L77	1H	
L23/L24	3M, 3L	Fix 3' either side.	L84	1H	
L27	1H	w/ spall at end of crack.	L85	2H	Fix 1.0' at 85/86 on 85 side
L30/L31	2H	Fix 2' either side.	L90	1H	L91 ramp to H-S Rd.
L31	1H		L93	1H	
L32	1H		L95	1H	
L33	1M	+ corner crack & spalling, fix 2' at 33/34 on 33 side	L97	1H	L98 H-S Rd.
L35	1M		L99	2H	Fix 1.0' at 99/100 on 99 side
L37	1H		L104	1/2H	Fix 1.0' at 104/105 on 104 side
L38	1M	At new entrance road.	L106	1H	
L39	3L		L107	1H	Several patches
L40	1L	+ 3L	L111	1H	

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
L43	1H		L113	1H	
L115	1H		L218	1H	
L120	1H		L221	1H	
L121	1L		L223	1H	
L132	1H		L229	1H	At McClernand Rd.
L133	1L	Fix 1.5' at 133/134 on 133 side	L233	1M	
L134a	1H	UDC Monument-turnaround - Replace entire UDC turnaround	L238	1M	
L135a	Potholes	UDC Monument-turnaround	L242	1H	
L134/135, R134/135	2H	Fix 3' either side joint	L243	1,3H	Replace the half on L242 side
L136a	1M	UDC Monument-turnaround	L244	1H	
L142	1H		L247	2H	Fix 2' at 246/247 on 247 side
L146	1H		L254	2H	Fix 1' at 254/255 on 254 side
L147		E-C Rd.	L261	1H	
L158	1H		L263	1H	
L165	1H		L269	1H	At H-P Rd.
L168	1H		L271	1H	
L179	1M		L272	1H	
L185	1M		L273	1H,2M	
L185/186 R185/186	2H	Fix 2.5' either side joint.	L275	1H	
L190 L189/190	1H 2H	Fix 1.5' at 189/190 on 190 side	L286	1H	
L192	1H		L292	1M	
L201	1H		L296	1H	
L205	1H		L315	1H	
L209	1H		L317	2H	Fix 2' at 316/317 on 317 side
L211	1H		L324	1H	

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
L214	Pothole	0.25'dia. at center of slab	L327	1H	
L329/330	H joint spalling	Fix 2' on either side	L360	1H	
L330/329	H joint spalling	Fix 2' on either side	L361	1H	
b/w L333 to 337 are 2 box culverts w/ AC o/L (reconstruct this section).			L362	1H	
L338	1H		L363	1H	
L340	1H		L365	1M	
L340/341	H joint spalling	Fix 2' on either side	L375	1H	
L344/345	H joint spalling	Fix 2' on either side	L377	1H	
L349	1H		L381	1H	
L350	1H		L384	1H	
L351/352	H joint spalling	Fix 2' on either side	L387	1M	
L352	1M		L396	1H	
L354	1H	3 transverse cracks	L403	1H	
L355	1H	several transverse cracks	L405	1H	
L356	1H	2 transverse cracks			
L357/358	L patch				

TABLE 1 - RPCC PAVEMENT CONDITION SURVEY RESULTS AND RECOMMENDATIONS CORINTH - PITTSBURG ROAD

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
R419	1H		R376/375	2H	Fix 2' each side
R413/412	H joint	Fix joint 2' each side	R373/372	2H	Fix 2' each side
R412/411	H joint	Fix joint 2' each side	R372	1H	
R410/409	H joint	Fix joint 2' each side	R372/371	2M	Fix 1' each side
R409/408	2H	Fix joint 2' each side	R371/370	2M	Fix 2' each side
R407/406	2H	Fix joint 1' on 407 side	R370/369	2M	Fix 1' each side
R404/403	2H	Fix joint 1' each side	R369/368	2M	Fix 1' each side
R403/402	2H	Fix 2' each side	R368	1H	
R402	1H		R368/367	2M	Fix 1' each side
R402/401	2H	Fix joint 2' each side	R367/366	2M	Fix 3' each side
R401/400	2H	Fix joint 2' each side	R365/364	2M	Fix 2' each side
R400	1H		R364	1H	
R398/397	2H	Fix 1' each side	R363/362	2M	Fix 2' each side
R397	1,3L		R361	1H	
R396	1M		R356	1H	
R396/395	2M	Fix 2' each side	R354	1H	Fix 2' at 354/353 on 354 side
R395/394	Bad Joint	Fix 2' each side	R352/351	2M	Fix 2' on 352 side
R394	1L		R350	1M	
R393	1H		R345	1H	
R392/391	Bad Joint	Fix 1' each side	R345/344	2H	Fix 2' on each side
R390/389	Bad Joint	Fix 1' each side	R344/343	2H	Fix 2' on each side
R387	1H		R343/342	2H	Fix 1' on each side
R384	1H		R342	1H	
R383	1M		R341	1H	
R381/380	Bad Joint	Fix 1' each side	R341/340	Bad Joint	Fix 1' on each side
R380/379	Bad Joint	Fix 2' each side	R340	1H	
R376	1H		R338	1H	

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
b/w R333 to R337 are two box culverts w/ AC o/L (reconstruct this section)					
R330/329	joint spalling	Fix 2' each side			
R329/328	2H	Fix 3' at 328 side			
R327	1H				
R324	1H				
R323/322	2H	Fix 2' each side			
R322	1H				
R321/320	2H	Fix 2' on 321 side			
R319	1H				
R317	1H		Gore area adjacent to R265/264	1H	
R315	1H		R262	1H	
R309	1H		R259	1H	
R307	1H		R257	1M	
R302	1H		R253	1H	Extra slabs on rt.
R296	1H		R237	1H	
R292	1H		R228	1H	
R286	1H		R224	1H	At McClernand Rd.
R280	1H		R221	1H	
R275	1H		R218	1H	
R272	1H		R215	1H	
R271	1H		R213	1H	
R269	1H				
R268	1H				
R266	1H				
R265	1H				
R263	1H				
R261	1H				

Replace Slab	Defects	Comments
R206	1M	
R196	1H	Extra slabs on rt.
R184	1H	
R180/179	2M	Fix 2' each side
R178	1M	
R178/177	2M	Fix 2' each side
R176/175	2M	Fix 3' each side
R170	1H	
R167	1H	
R162	1H	
R160/159	2H	Fix 4' each side
R159	1H	At culvert
R152	1M	
R148	1H	
R142	1H	
R141/140	2M	Fix 2' each side
R140	1H	
R140/139	2M	Fix 2' each side
R139/138	2M	Fix 2' each side
R136/135	2M	Fix 2' each side
R131/130	2M	Fix 2' each side
R128/127	2H	Fix 2' each side
Reconstruct AC pull-off on opp. side of road from UDC monument.		
R127/126	2M	Fix 2' each side
R124	1H	
R122	1H	
R119	1H,2M	
R108	1H	
R104	1H	
R99	1H,2M	
R97/96	2M	Fix 2' each side
R96/95	2M	Fix 2' each side

Replace Slab	Defects	Comments
R92	1H	
R88	1H	
R87	1H	
R83	1H	
R81	1H	
R78	1H	
R77	1H	
R68	1H	
R62	1H	
R57	1H	
R52	1H	
R45	1H	
R39/38	Bad Joint	Fix 2' each side
R37/36	2M	Fix 2' each side
R34	1H	
R32	1H	
R27	1H	
R22	1H	
R19	1H	
R13	1H	
R12/11	Bad Joint	Fix 2' each side
R11/10	2M	Fix 2' each side
R10	1H	
R10/9	2M	Fix 2' each side
R2	1H	

Defect Legend

1 = transverse crack near mid-slab
2 = corner break
3 = longitudinal cracks along dowels

L = Low severity
M = Medium severity
H = High severity

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments

APPENDIX G - Pavement Design

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Flexible Structural Design Module

Brown's Road Widening and parking area

CBR = 7

Flexible Structural Design

80-kN ESALs Over Initial Performance Period	26,331
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	72,398 kPa
Stage Construction	1
Calculated Design Structural Number	41 mm

Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	284
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	50 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	497
2	1	2	1.75	0	22,053
3	0.5	2	0.6	0	3,781
Total	100	-	-	-	26,331

Growth	Compound
Total Calculated Cumulative ESALs	26,331

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Surface Course	0.44	1	40	7.35	18
2	HACP Base Course	0.4	1	60	7.35	24

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
3	Aggregate Base Course	0.14	1	200	7.35	28
Total	-	-	-	300	-	70

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare Computer Software Product

Overlay Design Module

Pittsburg Landing Road I and Visitor Center/Cementery Parking Areas

AC Overlay of AC Pavement

Structural Number for Future Traffic	44 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	35	9
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	41,165
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,389 kPa
Calculated Structural Number for Future Traffic	44 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface Course	0.25	1	90
2	Aggregate Base Course	0.1	1	120

Milling Thickness 0 mm

Calculated Results*

Calculated Pavement Structural Number Before Milling	35 mm
Calculated Effective Pavement Structural Number	35 mm

*Note: This value is not represented by the inputs or an error occurred in calculation.

Future Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	444

Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	50 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	776
2	1	2	1.75	0	34,478
3	0.5	2	0.6	0	5,910
Total	100	-	-	-	41,165

Growth	Compound
Total Calculated Cumulative ESALs	41,165

Structural Number for New Existing Pavement

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	AC Surface	0.25	1	90
2	Granular Base	0.1	1	120

Milling Thickness 0 mm

Calculated Results

Calculated New Structural Number Before Milling	35 mm
Calculated New Structural Number	35 mm

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Overlay Design Module

Visitor Center
Use ADT from Pittsburg landing Rd II
CBR = 6

AC Overlay of AC Pavement

Structural Number for Future Traffic: 16 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	32	0
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	228
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	62,055 kPa
Calculated Structural Number for Future Traffic	16 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface Course	0.2	1	95
2	Aggregate Base Course	0.1	1	130

Milling Thickness: 0 mm

Calculated Results*

Calculated Pavement Structural Number Before Milling	32 mm
Calculated Effective Pavement Structural Number	32 mm

*Note: This value is not represented by the inputs or an error occurred in calculation.

Future Rigorous ESAL Calculation

Performance Period (years) -

Two-Way Traffic (ADT)	-
Number of Lanes in Design Direction	-
Percent of All Trucks in Design Lane	- %
Percent Trucks in Design Direction	- %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
Total	-	-	-	-	-

Growth	Simple
Total Calculated Cumulative ESALs	- *

*Note: This value is not represented by the inputs or an error occurred in calculation.

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Overlay Design Module

Entrance road - AC Overlay
Using same ADT as Pittsburg landing Road I

AC Overlay of AC Pavement

Structural Number for Future Traffic	44 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	17	27
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	41,165
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,398 kPa
Calculated Structural Number for Future Traffic	44 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface Course	0.25	1	35
2	Aggregate Base Course	0.1	1	85

Milling Thickness 0 mm

Calculated Results

Calculated Pavement Structural Number Before Milling	17 mm
Calculated Effective Pavement Structural Number	17 mm

Future Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	444
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %

Percent Trucks in Design Direction 50 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	776
2	1	2	1.75	0	34,478
3	0.5	2	0.6	0	5,910
Total	100	-	-	-	41,165

Growth Compound

Total Calculated Cumulative ESALs 41,165

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	62	-	27
Total	-	-	-	62	-	27

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Overlay Design Module

Brown's Landing Road
CBR = 7

AC Overlay of AC Pavement

Structural Number for Future Traffic	41 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	23	18
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	26,145
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,398 kPa
Calculated Structural Number for Future Traffic	41 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface Course	0.25	1	90

Milling Thickness 0 mm

Calculated Results

Calculated Pavement Structural Number Before Milling	23 mm
Calculated Effective Pavement Structural Number	23 mm

Future Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	282
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	50 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	493
2	1	2	1.75	0	21,898
3	0.5	2	0.6	0	3,754
Total	100	-	-	-	26,145

Growth Compound

Total Calculated Cumulative ESALs 26,145

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Overlay Design Module

McClemand Road - Overlay Section
ADT data from Corinth-Pittsburg Landing Rd = 345 (1995)
CBR = 6

AC Overlay of AC Pavement

Structural Number for Future Traffic	50 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	19	31
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	63,972
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	62,055 kPa
Calculated Structural Number for Future Traffic	50 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface Course	0.25	1	75

Milling Thickness: 0 mm

Calculated Results

Calculated Pavement Structural Number Before Milling	19 mm
Calculated Effective Pavement Structural Number	19 mm

Future Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	345
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %

Percent Trucks in Design Direction 100 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	1,206
2	1	2	1.75	0	53,580
3	0.5	2	0.6	0	9,185
Total	100	-	-	-	63,972

Growth Compound

Total Calculated Cumulative ESALs 63,972

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	70	-	31
Total	-	-	-	70	-	31

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Overlay Design Module

Rhea Springs Road
CBR = 7

AC Overlay of AC Pavement

Structural Number for Future Traffic	39 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	25	14
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	21,139
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,398 kPa
Calculated Structural Number for Future Traffic	39 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface	0.25	1	100

Milling Thickness 0 mm

Calculated Results

Calculated Pavement Structural Number Before Milling	25 mm
Calculated Effective Pavement Structural Number	25 mm

Future Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	114
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	100 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	399
2	1	2	1.75	0	17,705
3	0.5	2	0.6	0	3,035
Total	100	-	-	-	21,139

Growth Compound

Total Calculated Cumulative ESALs 21,139

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare Computer Software Product

Overlay Design Module

Reconnoitering Road
CBR=7

AC Overlay of AC Pavement

Structural Number for Future Traffic	39 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	27	12
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	21,139
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,398 kPa
Calculated Structural Number for Future Traffic	39 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface Course	0.25	1	80
2	Aggregate Base Course	0.1	1	65

Milling Thickness 0 mm

Calculated Results

Calculated Pavement Structural Number Before Milling	27 mm
Calculated Effective Pavement Structural Number	27 mm

Future Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	114
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %

Percent Trucks in Design Direction 100 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	399
2	1	2	1.75	0	17,705
3	0.5	2	0.6	0	3,035
Total	100	-	-	-	21,139

Growth Compound

Total Calculated Cumulative ESALs 21,139

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Overlay Design Module

Eastern Corinth Road

CBR = 6

AC Overlay of AC Pavement

Structural Number for Future Traffic	45 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	37	8
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	31,986
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	62,055 kPa
Calculated Structural Number for Future Traffic	45 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface Course	0.25	1	100
2	Aggregate Base Course	0.1	1	120

Milling Thickness 0 mm

Calculated Results

Calculated Pavement Structural Number Before Milling	37 mm
Calculated Effective Pavement Structural Number	37 mm

Future Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	345
Number of Lanes in Design Direction	1

Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	50 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	603
2	1	2	1.75	0	26,790
3	0.5	2	0.6	0	4,593
Total	100	-	-	-	31,986

Growth	Compound
Total Calculated Cumulative ESALs	31,986

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

1997 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

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Computer Software Product

Overlay Design Module

Hamburg-Savannah Road
ADT = 345 (USED SAME ADT AS CORINTH-PITTSBURG)

AC Overlay of AC Pavement

Structural Number for Future Traffic: 50 mm

Design Method	Effective Existing Structural Number (mm)	Overlay Structural Number (mm)
Component Analysis	20	30
Remaining Life	-	-
Non-Destructive Testing	-	-

Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	63,972
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	62,055 kPa
Calculated Structural Number for Future Traffic	50 mm

Effective Pavement Thickness - Component Analysis Method

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (mm)
1	HACP Surface Course	0.25	1	80
2	Aggregate Base Course	0.1	1	0

Milling Thickness: 0 mm

Calculated Results

Calculated Pavement Structural Number Before Milling	20 mm
Calculated Effective Pavement Structural Number	20 mm

Future Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	345
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %

Percent Trucks in Design Direction 100 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 80-kN ESALs over Performance Period
1	98.5	2	0.0004	0	1,206
2	1	2	1.75	0	53,580
3	0.5	2	0.6	0	9,185
Total	100	-	-	-	63,972

Growth Compound

Total Calculated Cumulative ESALs 63,972

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(mm)	Width (m)	Calculated SN (mm)
1	HACP Overlay	0.44	1	70	-	31
Total	-	-	-	70	-	31

APPENDIX H - Allowable Bearing Capacity and Settlement Calculations

Form FHWA-1460 (Rev. 3-74)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

MADE BY KM DATE 5/11/00 PROJECT SHIL 502(1)

CHECKED BY ..... DATE .....

CALCULATIONS FOR Small bridge foundations @ Reconnaitering road. SHEET NO. 1/3

Ultimate Bearing Capacity

- Using Meyerhof's bearing capacity eqn. :-

$$q_{ult.} = c N_c s_c d_c + \bar{q} N_q s_q d_q + 0.5 \gamma B' N_\gamma s_\gamma d_\gamma \quad \text{---(1)}$$

Based on the boring logs subsurface soils at the bridge site consist of silty sand & silty clay. with SPT N-values ranging from 2 to 30 blows per 300 mm.

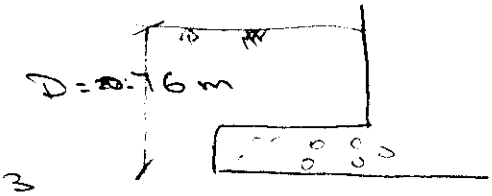
Average SPT N-value will be used = 6

∴ assume $c = 0$ (Cohessionless soils)

∴ from table 3-4 (Foundation analysis & design)

@ $N = 6 \Rightarrow \phi = 28°$

$\gamma = 17.6 \text{ KN/m}^3$



Calcate shape & depth factors :-

for $\phi > 10°$

$$s_q = s_\gamma = 1 + 0.1 K_p \frac{B}{L}$$

- Assume $B = 1.5$ m, $L = 6.5$ m (one lane + Pedes.)

∴ $B/L = 0.23$

$$K_p = \tan^2\left(45 + \frac{28}{2}\right) = 2.77$$

$$\therefore s_q = s_\gamma = 1 + 0.1(2.77)(0.23) = 1.06$$ (1.04)

- $d_q = d_\gamma = 1 + 0.2\sqrt{K_p}\,\frac{D}{B}$

$$D/B = \frac{0.76}{1.5} = 0.51$$

$\therefore d_c = d_\gamma = 1 + 0.2\sqrt{2.77}(0.51) = 1.17$ 1.17

From Table 4-4 (Bowels) $N_q = 14.7$ & $N_\gamma = 11.2$

$\therefore$ Sub. in eqn. (1) above

$$q_{ult.} = 17.6 * 0.76 * 14.7 * 1.06 * 1.17 + 0.5 * 17.6 * 1.5 * 11.2 * 1.06 * 1.17$$

$$= 243.86 + 183.35 = 427.21 \text{ kPa}$$ 385

$$\therefore q_{all} = \frac{q_{ult.}}{FS} = \frac{427.21}{3} = 142.4 \text{ kPa}$$ 123. (≈ 2971 lb/ft^2)

use allowable bearing pressure of

142 kPa (≈ 2900 lb/ft^2)

1680

Assuming no overburden

$$\therefore q_{all} = \frac{183.35}{3} = 61.1 \text{ kPa} (1270 \text{ lb/ft}^2)$$

$\therefore$ In case of no overburden with a footing width of 1.5 m the

allowable bearing capacity = 61 kPa (1270 lb/ft

- Try $B = 2.0$ m (6.5')

$\therefore B/L = 0.31$

$S_{q\gamma} = S_\gamma = 1.09$, $d_{q\gamma} = d_\gamma = 1.17$

$$\therefore q_{ult} = 243.9 + 0.5 * 17.6 * 2.0 * 11.2 * 1.09 * 1.17$$

251.39

$q_{ult.} = 243.9 + 251.39 = 495.29$ KPa

$q_{all} = \frac{495.29}{3} = 165.1$ KPa (3446 lb/ft²)

- with B = 2.0 m & D = 0.46 m

$\therefore q_{all} = 165.0$ KPa (3400 lb/ft²)

- with B = 2.0 & D = 0

$\therefore q_{all} = 83.$ KPa (1700 lb/ft²)

- Try B = 2.5 m
B/L = 0.38

$S_q = S_\gamma = 1.4$; $d_q = d_\gamma = 1.1$

$\therefore q_{ult} = 238 + 300.85$

$= 538.85$ KPa

$q_{all} = \frac{538.85}{3} = 179.6$ KPa (3750 $\frac{lb}{ft^2}$)

No overburden ; $q_{all} = \frac{300.85}{3} = 100.3$ KPa

using the method in AASHTO, 1996 to calculate settlement-

$$S_e = q_o \frac{(1-\nu^2)\sqrt{A}}{E_s \beta_s} \qquad (1)$$

From Table 4.4.7.2.2A for loose sand

$\Rightarrow E_s = 600 \text{ ksf} = 28729 \text{ KPa}$

$\nu = 0.3$

From table 4.4.7.2.2B

B (m)	L (m)	L/B	β_s	A (m^2)
1.5	9.5	6.3	1.25	14.25
2.0	9.5	4.25	1.21	19.0
2.5	9.5	3.8	1.17	23.75

Sub. in eqn. (1)

$\therefore S_e = 13.6 \simeq 14 \text{ mm}$ at $B = 1.5 \text{ m}$

$= 18.8 \simeq 19 \text{ mm}$ at $B = 2.0 \text{ m}$

$= 23.6 \simeq 24 \text{ mm}$ at $B = 2.5 \text{ m}$